

**METALS
STOCK
LIST**

**DUCOMMUN
METALS & SUPPLY CO.**

DUCOMMUN

Serving Industry Since 1849

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Service Center	Oklahoma City:	631-1331
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PURCHASING

DEPT Y
Jimmie

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STEEL } CARBON
 } STAINLESS
 } ALLOY

ALUMINUM

BRASS

COPPER

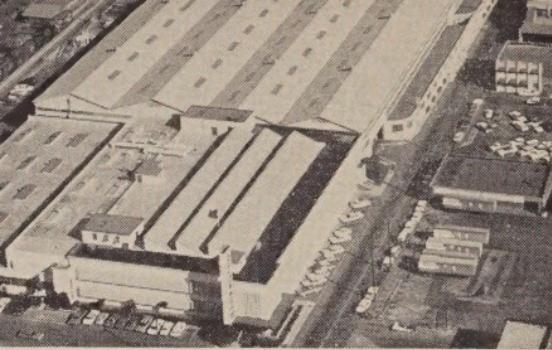
COMPLETE CUTTING
and GRINDING SERVICE...

IMMEDIATE
DELIVERIES

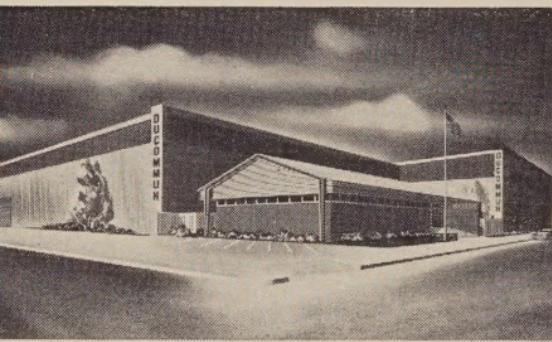
METALLURGICAL
AND TECHNICAL
SERVICE

DUCOMMUN
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GEORGE E. MAYCOCK



**LOS ANGELES
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4890 So. Alameda St.
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Terminal Annex
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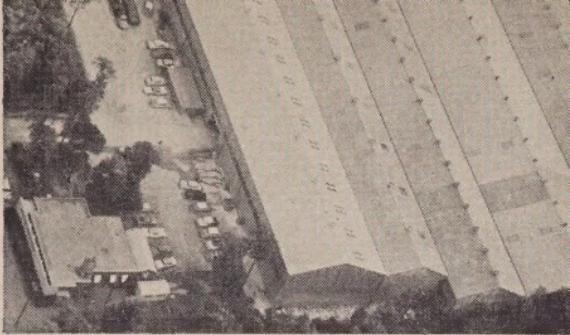


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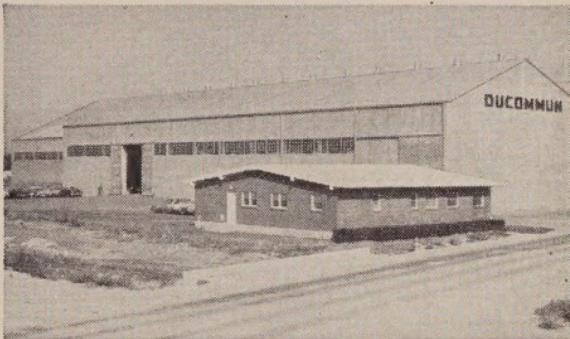


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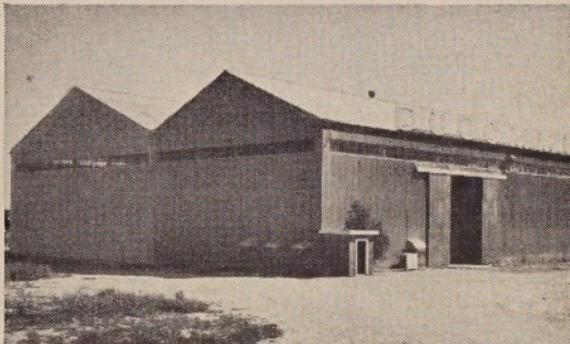


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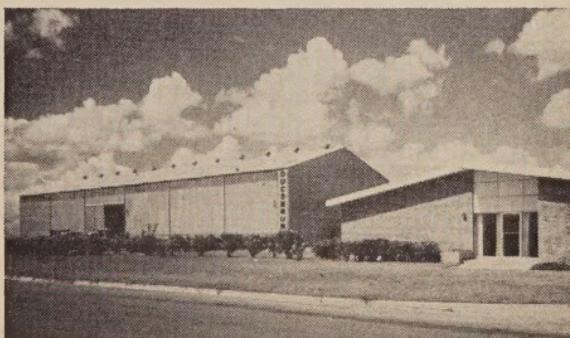


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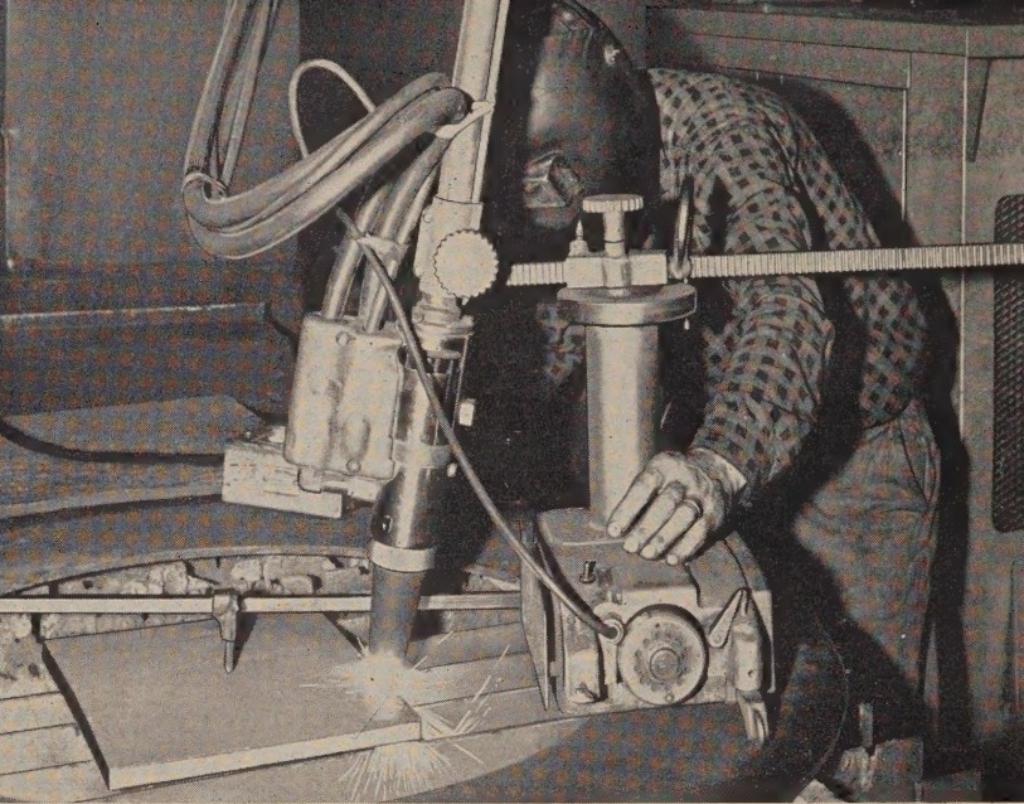
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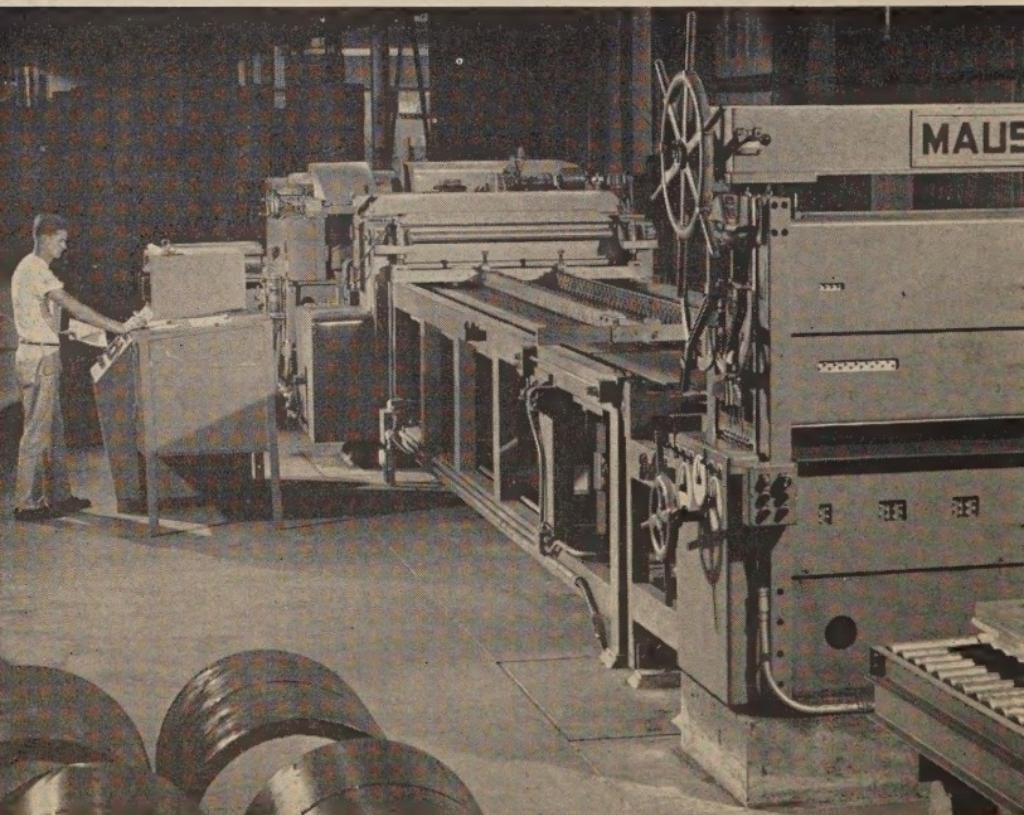


STACKER CRANE (5-ton capacity)
transports material from racks to
packing area with no material damage



PLASMA FLAME CUTTING

metal plate cut by plasma jet at ultra high temperature produces high quality cuts at greatly increased speeds

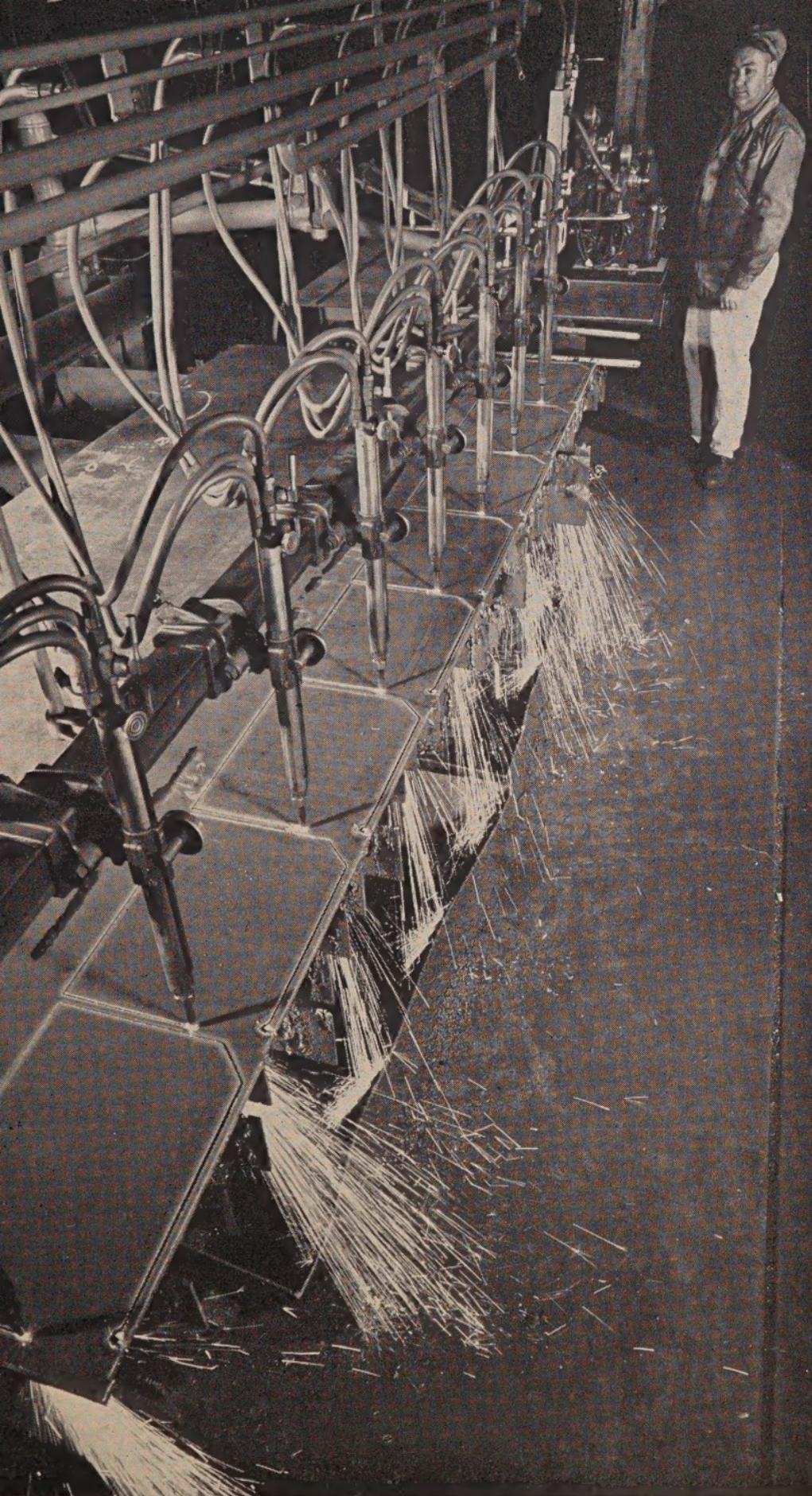


DAHLSTROM DECOILING AND CUTTING TO LENGTH LINE AND MAUST PRECISION ROLLER LEVELER

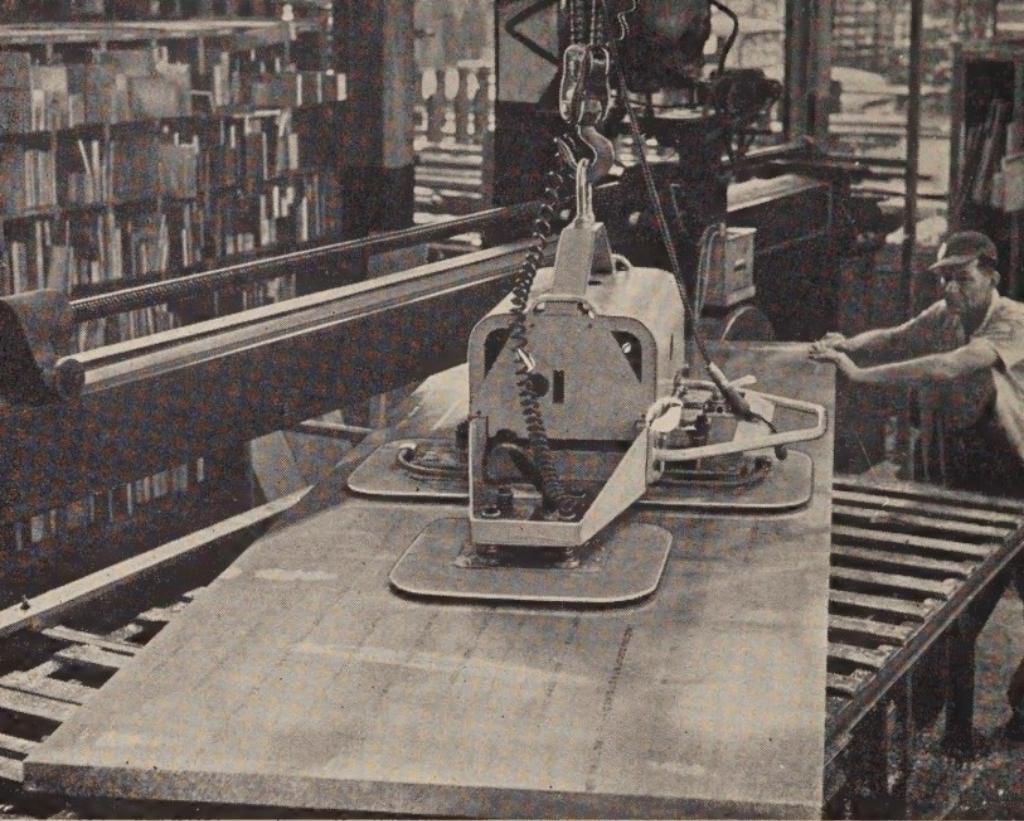
Coil Weight, Max. 15,000 Lbs. Coil Width, Max. 48 Inches
Length of Cut: Min. 12 Inches, Max. 16 Feet

Material Thickness

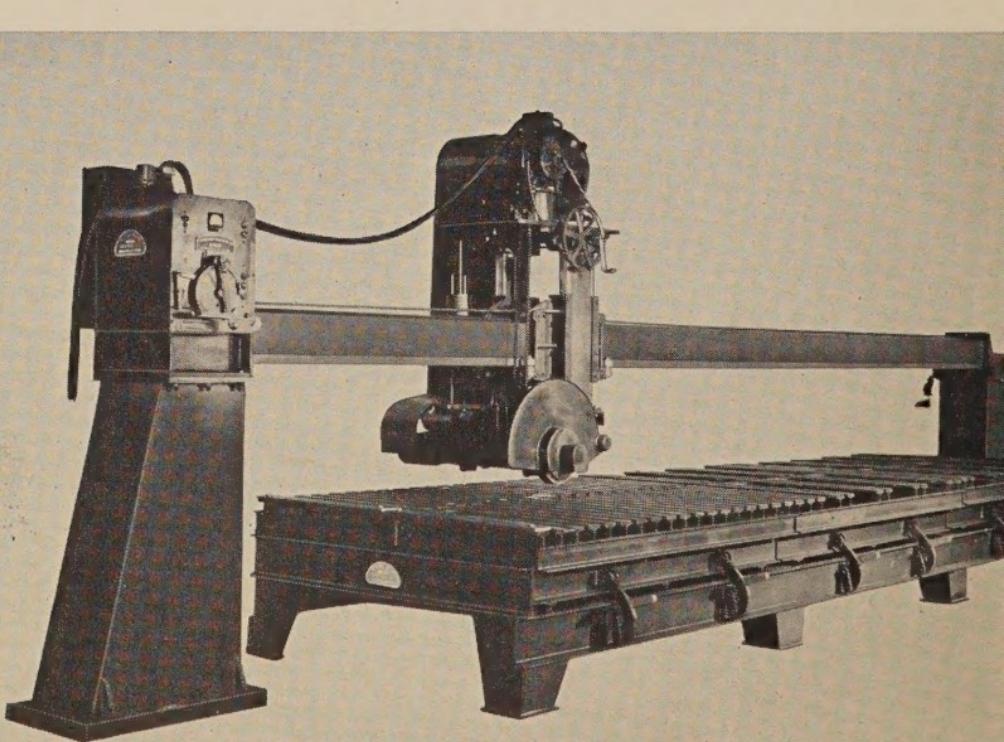
	Min.	Max.
Aluminum	.016 Inch	.093 Inch
Cold Rolled Steel	.016 Inch	.075 Inch
Stainless Steel	.016 Inch	.063 Inch



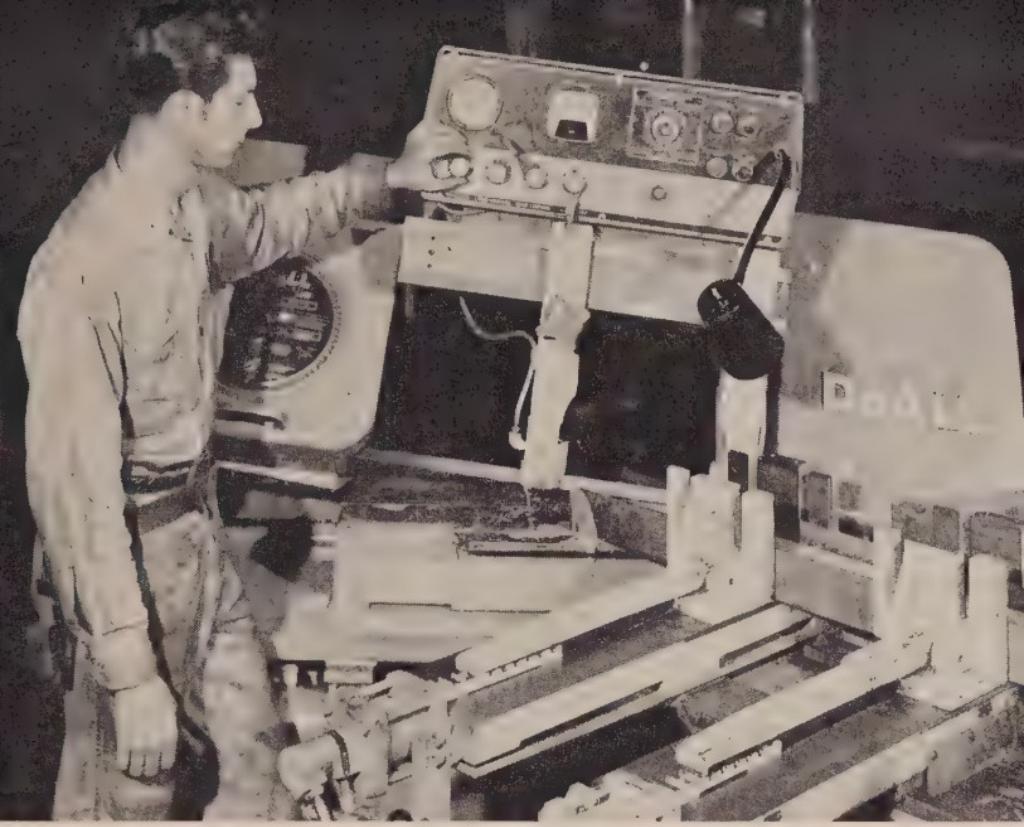
FLAME CUTTING STEEL PLATE
Capacities $\frac{1}{4}$ to 10 inches



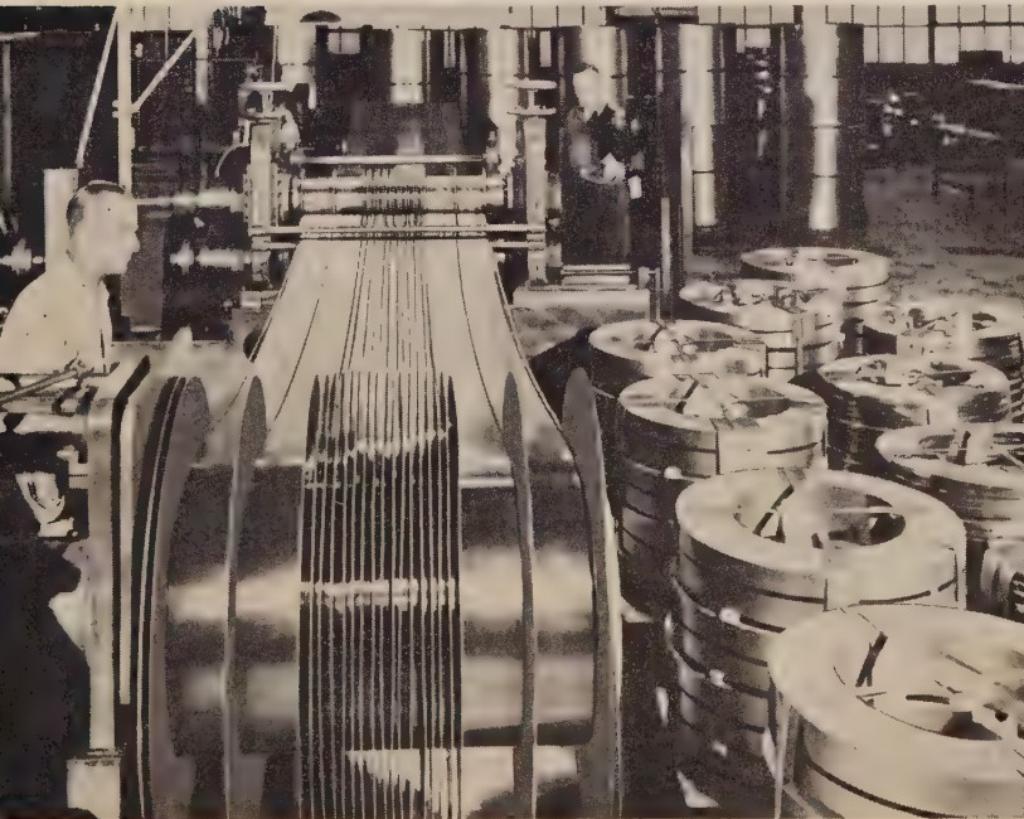
PNEUMATIC HOIST
handles nonferrous metal plates
with no damage to material



NEW TY-SA-MAN CIRCULAR METAL CUTTING SAW
with oscillating head capable of cutting
stainless steel plate up to 3 inches thick.



Do ALL HORIZONTAL POWER BAND SAW
fully automatic for faster straight
and bevel cutting and greater accuracy.
Capacity: 12 inches x 12 inches.



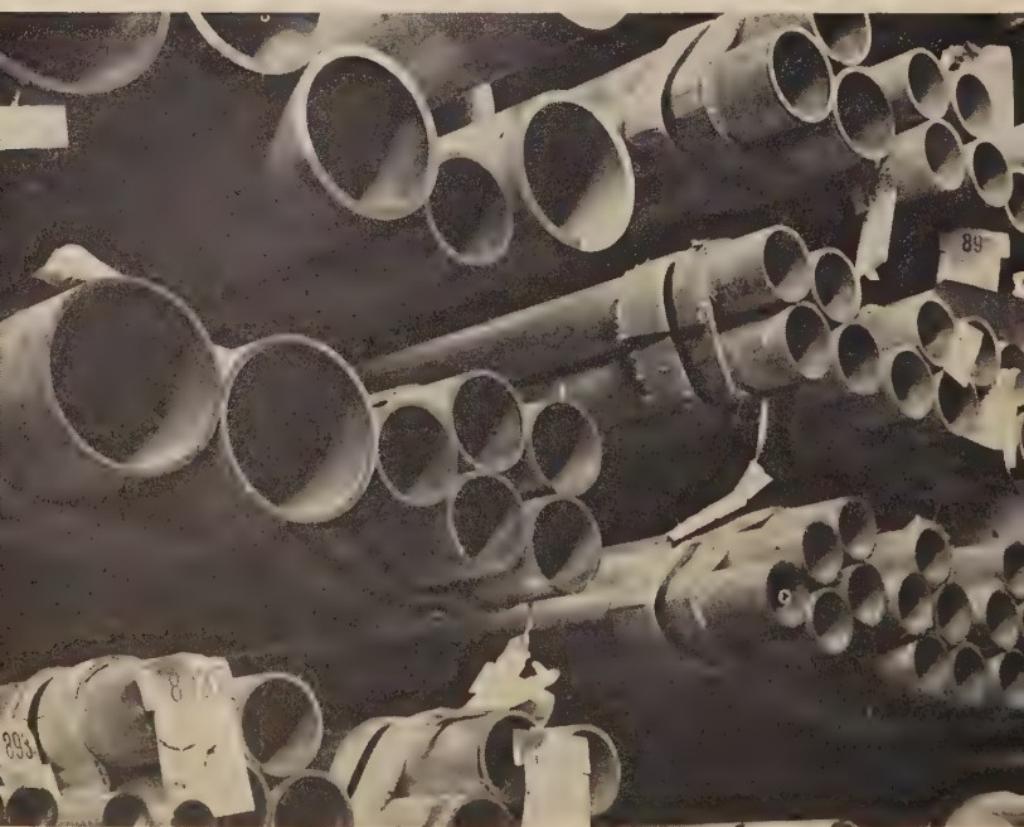
SLITTER
capacities $\frac{3}{8}$ " to 48" in width



COIL STOCK AND COLD HEADING WIRE

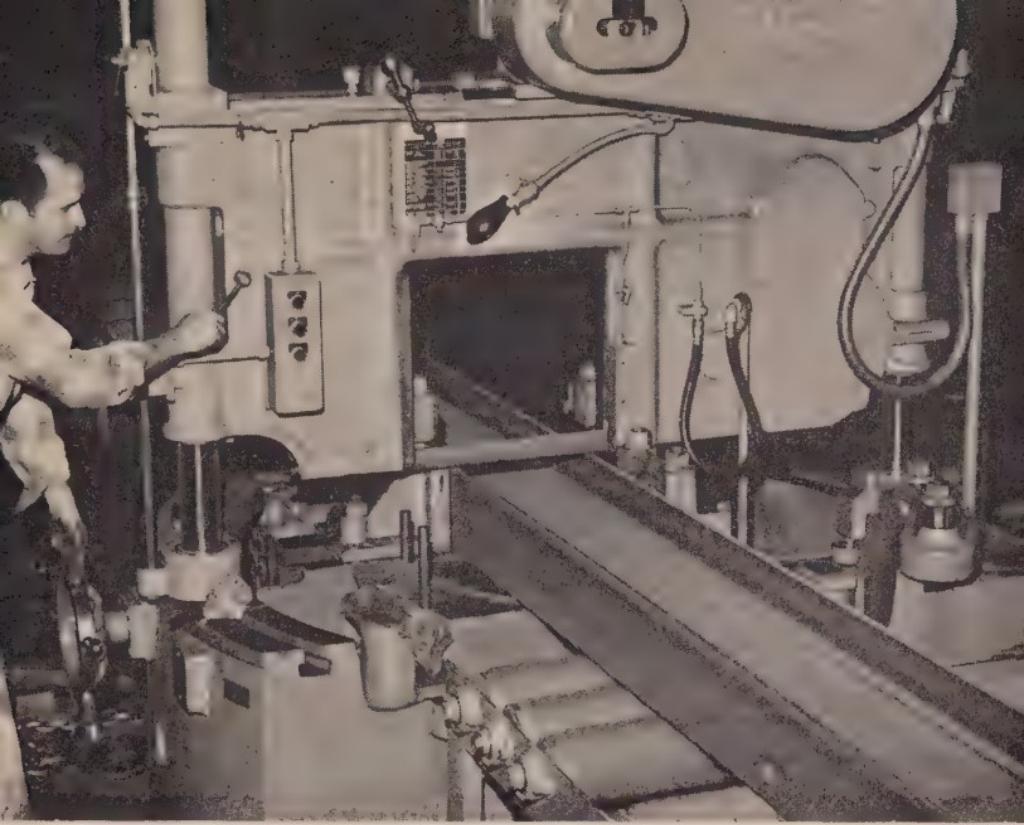
carbon, stainless steel and aluminum

Each cold heading wire coil is inspected and approved by our metallurgists before shipment.



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carbon, alloy & stainless steel, aluminum, brass and copper. Seamless and welded mechanical, structural pressure and boiler tubes.



HYDRAULIC POWER HACKSAW
for cutting Structural Steel
and Heavy Bar Stock



BAR STOCK
carbon, alloy, stainless steel,
aluminum, brass and copper

GENERAL INFORMATION

QUOTATIONS — ALL quotations are subject to change without notice and all sales are made subject to strikes, accidents, or other unavoidable delays.

CONFIRMATION ORDERS — Confirming orders should be marked "Confirmation," preferably across the face of order, to avoid possibility of duplication.

Errors and Claims

We will gladly correct errors promptly when called to our attention. Information in this book is subject to error and is not guaranteed.

We reserve the right to correct stenographic errors in quotations or invoices.

CLAIMS. All claims must be made within 5 days after receipt of goods.

METALS. All metals or materials furnished by us that prove defective or not up to standard will be replaced, *provided they have not been improperly used. Under no circumstances will claims be allowed for damages or for any expense, including labor, incurred by the use of metals, materials or goods furnished by us.*

CUT LENGTHS. All metals or materials cut to special lengths or dimensions, cannot be returned for credit or exchange.

Shipments

Definite instructions as to route, packing, insurance, etc., should accompany all orders, otherwise goods will be packed and shipped according to our best judgment.

RESPONSIBILITY. All orders not quoted F.O.B. destination are accepted with the understanding that they move at the risk of the purchaser, as delivery to the transportation company in good condition ends our responsibility.

Returning Goods

It is necessary to obtain our permission before returning materials.

If permission is given, please —

1. List the articles to be returned.
 - a. The invoice date.
 - b. Our packing list and invoice number.
2. Pack all goods carefully.
3. Prepay all transportation charges.
4. Write our address plainly and be sure to have your name and address on the tag or parcel where it can be easily read.

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COPPER**SPECIFICATIONS**

*The specifications marked with an asterisk are the specifications to which the material is ordered and to which we can furnish test reports.

FED.	QQ-C-576a	Hot Rolled Sheet Copper.....	.....
		Soft Copper in Rolls.....	.....
FED.	QQ-C-502A	Round and Square Copper Rod.....	.....
	QQ-C-504A	Copper Bus Bar.....	.....
	QQ-W-341	Bare Soft Copper Wire.....
	*WW-T-775	Soft Copper Tubing No. 20 Ga. Only..	Type N

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SOFT COPPER SHEETS — Alloy No. 100

Dimensions Inches	Approx. Wt. Lbs. per Sheet	Dimensions Inches	Approx. Wt. Lbs. per Sheet
8 Oz. (.500 Lb. per Sq. Ft.) .0108 Decimal Inch		48 Oz. (3.00 Lbs. per Sq. Ft.) .0647 Decimal Inch	
24x96..... 8.00		30x96..... 60.00	
10 Oz. (.625 Lb. per Sq. Ft.) .0135 Decimal Inch		36x96..... 72.00	
30x96..... 12.50		36x120..... 90.00	
12 Oz. (.750 Lb. per Sq. Ft.) .0162 Decimal Inch		48x96..... 96.00	
30x96..... 15.00		48x120..... 120.00	
14 Oz. (.875 Lb. per Sq. Ft.) .0189 Decimal Inch		60x120..... 150.00	
24x96..... 14.00		56 Oz. (3.500 Lbs. per Sq. Ft.) .0755 Decimal Inch	
30x96..... 17.50		48x96..... 112.00	
36x96..... 21.00		64 Oz. (4.00 Lbs. per Sq. Ft.) .0863 Decimal Inch	
15 Oz. (.9375 Lb. per Sq. Ft.) .020 Decimal Inch		30x96..... 80.00	
30x96..... 18.75		36x96..... 96.00	
16 Oz. (1.00 Lb. per Sq. Ft.) .0216 Decimal Inch		48x96..... 128.00	
24x96..... 16.00		60x96..... 160.00	
30x96..... 20.00		60x120..... 200.00	
30x120..... 25.00		4½ Lbs. (4.500 Lbs. per Sq. Ft.) .0970 Decimal Inch	
36x96..... 24.00		30x96..... 90.00	
36x120..... 30.00		48x144..... 216.00	
48x96..... 32.00		5 Lbs. (5.00 Lbs. per Sq. Ft.) .1078 Decimal Inch	
18 Oz. (1.125 Lbs. per Sq. Ft.) .0243 Decimal Inch		36x120..... 150.00	
36x96..... 27.00		48x96..... 160.00	
20 Oz. (1.250 Lbs. per Sq. Ft.) .0270 Decimal Inch		6 Lbs. (6.00 Lbs. per Sq. Ft.) .1294 Decimal Inch	
36x96..... 30.00		30x96..... 120.00	
24 Oz. (1.500 Lbs. per Sq. Ft.) .0323 Decimal Inch		36x120..... 180.00	
24x96..... 24.00		48x96..... 192.00	
30x96..... 30.00		60x96..... 240.00	
36x96..... 36.00		60x120..... 300.00	
36x120..... 45.00		5/32 In. (7.245 Lbs. per Sq. Ft.) .15625 Decimal Inch	
28 Oz. (1.750 Lbs. per Sq. Ft.) .0377 Decimal Inch		30x96..... 144.68	
30x96..... 35.00		3/16 In. (8.694 Lbs. per Sq. Ft.) .1875 Decimal Inch	
36x96..... 42.00		30x96..... 173.88	
32 Oz. (2.00 Lbs. per Sq. Ft.) .0431 Decimal Inch		9 Lbs. (9.00 Lbs. per Sq. Ft.) .1941 Decimal Inch	
30x96..... 40.00		60x120..... 450.00	
36x96..... 48.00		1/4 In. (11.59 Lbs. per Sq. Ft.) .250 Decimal Inch	
48x96..... 64.00		36x96..... 278.16	
48x120..... 80.00		48x96..... 370.88	
36x120..... 57.00		60x120..... 579.26	
36 Oz. (2.250 Lbs. per Sq. Ft.) .0485 Decimal Inch		5/8 In. (17.39 Lbs. per Sq. Ft.) .375 Decimal Inch	
30x96..... 45.00		30x96..... 347.80	
36x96..... 54.00		1/2 In. (23.18 Lbs. per Sq. Ft.) .500 Decimal Inch	
48x120..... 92.20		48x120..... 927.20	
38 Oz. (2.355 Lbs. per Sq. Ft.) .051 Decimal Inch		5/8 In. (28.98 Lbs. per Sq. Ft.) .625 Decimal Inch	
30x96..... 47.50		48x120..... 1159.20	
36x96..... 57.00		9/16 In. (34.78 Lbs. per Sq. Ft.) .750 Decimal Inch	
48x120..... 100.00		48x120..... 1391.20	

COLD ROLLED COPPER SHEETS — Alloy No. 100

Dimensions Inches	Approx. Wt. Lbs. per Sheet	Dimensions Inches	Approx. Wt. Lbs. per Sheet
8 Oz. (.500 Lb. per Sq. Ft.) .0108 Decimal Inch		48 Oz. (3.00 Lbs. per Sq. Ft.) .0647 Decimal Inch	
24x96..... 8.00		30x96..... 60.00	
10 Oz. (.625 Lb. per Sq. Ft.) .0135 Decimal Inch		36x96..... 72.00	
30x96..... 12.50		48x96..... 96.00	
12 Oz. (.750 Lb. per Sq. Ft.) .0162 Decimal Inch		48x120..... 120.00	
30x96..... 15.00		60x120..... 150.00	
14 Oz. (.875 Lb. per Sq. Ft.) .0189 Decimal Inch		64 Oz. (4.00 Lbs. per Sq. Ft.) .0863 Decimal Inch	
36x96..... 21.00		36x96..... 96.00	
16 Oz. (1.00 Lb. per Sq. Ft.) .0216 Decimal Inch		48x96..... 128.00	
24x96..... 16.00		4½ Lbs. (4.500 Lbs. per Sq. Ft.) .0970 Decimal Inch	
24x120..... 20.00		30x96..... 90.00	
30x96..... 20.00		48x120..... 180.00	
30x120..... 25.00		5 Lbs. (5.00 Lbs. per Sq. Ft.) .1078 Decimal Inch	
36x96..... 24.00		30x96..... 100.00	
36x120..... 30.00		48x96..... 160.00	
48x96..... 32.00		6 Lbs. (6.00 Lbs. per Sq. Ft.) .1294 Decimal Inch	
18 Oz. (1.125 Lbs. per Sq. Ft.) .0243 Decimal Inch		30x96..... 120.00	
24x96..... 18.00		48x96..... 192.00	
30x96..... 22.50		60x120..... 300.00	
36x96..... 27.00		60x144..... 360.00	
20 Oz. (1.250 Lbs. per Sq. Ft.) .0270 Decimal Inch		5/32 In. (7.234 Lbs. per Sq. Ft.) .1562 Decimal Inch	
24x96..... 20.00		30x96..... 144.68	
30x96..... 25.00		3/16 In. (8.694 Lbs. per Sq. Ft.) .1875 Decimal Inch	
36x96..... 30.00		48x120..... 347.76	
36x120..... 37.50		9 Lbs. (9.00 Lbs. per Sq. Ft.) .1941 Decimal Inch	
24x96..... 24.00		30x60..... 112.50	
30x96..... 30.00		48x96..... 288.00	
30x120..... 37.50		60x120..... 450.00	
36x96..... 36.00		1/4 In. (11.59 Lbs. per Sq. Ft.) .250 Decimal Inch	
36x120..... 45.00		30x96..... 231.80	
48x96..... 48.00		36x96..... 278.16	
48x120..... 60.00		60x120..... 579.26	
32 Oz. (2.00 Lbs. per Sq. Ft.) .0431 Decimal Inch		5/8 In. (17.39 Lbs. per Sq. Ft.) .375 Decimal Inch	
30x96..... 40.00		30x96..... 347.80	
30x120..... 50.00		36x120..... 521.70	
36x96..... 48.00		1/2 In. (23.18 Lbs. per Sq. Ft.) .500 Decimal Inch	
36x120..... 60.00		24x96..... 370.88	
48x96..... 64.00		48x96..... 741.76	
48x120..... 80.00		5/8 In. (28.98 Lbs. per Sq. Ft.) .625 Decimal Inch	
36 Oz. (2.250 Lbs. per Sq. Ft.) .0486 Decimal Inch		36x96..... 695.52	
24x96..... 36.00		1 In. (46.37 Lbs. per Sq. Ft.) 1.000 Decimal Inch	
30x96..... 45.00		36x120..... 1391.10	
36x96..... 54.00		1 1/2 In. (69.54 Lbs. per Sq. Ft.) 1.500 Decimal Inch	
40 Oz. (2.500 Lbs. per Sq. Ft.) .0539 Decimal Inch		24x48..... 556.32	
20x120..... 41.67			
36x96..... 60.00			
48x96..... 80.00			
48x120..... 100.00			

SOFT COPPER—IN ROLLS—Alloy No. 100**Cold Rolled and Annealed**

Width Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per Roll	Width Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per Roll
36 B&S GAGE (.005 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.2318 Lbs.		Approx. Wt. per Sq. Ft.	1.00 Lbs.	
6.....	.116.....	100	16.....	1.33.....	100
12.....	.232.....	100			
34 B&S GAGE (.0063 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.2921 Lbs.		Approx. Wt. per Sq. Ft.	1.126 Lbs.	
12.....	.292.....	100	12.....	1.126.....	100
			16.....	1.50.....	100
8 Oz. (.0108 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.500 Lbs.		Approx. Wt. per Sq. Ft.	1.25 Lbs.	
12.....	.500.....	100	12.....	1.25.....	500
			14.....	1.458.....	500
10 Oz. (.0135 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.6259 Lbs.		Approx. Wt. per Sq. Ft.	1.50 Lbs.	
12.....	.626.....	100	10.....	1.25.....	500
			12.....	1.50.....	500
12 Oz. (.0162 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.7511 Lbs.		Approx. Wt. per Sq. Ft.	1.75.....	
12.....	.751.....	100	16.....	2.00.....	500
			18.....	2.25.....	500
14 Oz. (.0189 Decimal Inch)					
Approx. Wt. per Sq. Ft.	.8763 Lbs.		Approx. Wt. per Sq. Ft.	2.00.....	
12.....	.876.....	100	12.....	2.323.....	500
16 Oz. (.0216 Decimal Inch)					
Approx. Wt. per Sq. Ft.	1.00 Lbs.		Approx. Wt. per Sq. Ft.	2.25.....	
6.....	.50.....	100	14.....	2.50.....	500
10.....	.84.....	100			
12.....	1.00.....	100			
14.....	1.16.....	100			

SHIM COPPER—1/4 HARD*In Rolls — 6 Inches Wide*

Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per Roll
.001.....	.0231.....	10-20
.002.....	.0463.....	10-20
.003.....	.0695.....	10-20

SPRING COPPER*In Rolls — 6 Inches Wide*

B&S Gage	Thickness Dec. In.	Approx. Sq. Ft.	Wt. Lbs. per Roll
36.....	.0050.....	.232.....	50

COLD ROLLED PHOSPHOR DEOXIDIZED COPPER SHEETS**Alloy No. 103 — Spec. QQ-C-576A**

Thickness Dec. In.	Dimensions Inches	Approx. Wt. Lbs. per Sheet	Thickness Dec. In.	Dimensions Inches	Approx. Wt. Lbs. per Sheet
.063....	36x96....	2.93....	.500....	36x120....	23.30....
.250....	36x120....	11.60....	1.000....	36x120....	699.00....

BARE SOFT COPPER WIRE—Alloy No. 100*Random Weight Coils*

B&S Gage	Diameter Dec. In.	Approx. Ft. 1 Lb.	Approx. Wt. Lbs. per 100 Ft.	B&S Gage	Diameter Dec. In.	Approx. Ft. 1 Lb.	Approx. Wt. Lbs. per 100 Ft.
1.....	.2893.....	3.94.....	25.33.....	12.....	.0808.....	50.59.....	1.97.....
2.....	.2576.....	4.97.....	20.09.....	14.....	.0640.....	80.44.....	1.24.....
4.....	.2043.....	7.91.....	12.64.....	15.....	.0570.....	101.40.....	.98.....
5.....	.1819.....	9.98.....	10.02.....	16.....	.0508.....	127.90.....	.78.....
6.....	.1620.....	12.58.....	7.94.....	18\$.....	.0403.....	203.40.....	.49.....
8.....	.1285.....	20.01.....	4.99.....	20.....	.0319.....	323.40.....	.30.....
10.....	.1019.....	31.82.....	3.14.....	22.....	.0253.....	514.20.....	.19.....
11.....	.0907.....	40.12.....	2.49.....	24.....	.0201.....	817.70.....	.12.....

HARD COPPER RODS—Alloy No. 100

Lengths 12 Foot Random

ROUND						SQUARE					
Diam.	Approx. Wt.		Diam.	Approx. Wt.		Diam.	Approx. Wt.		Diam.	Approx. Wt.	
In.	Lin. Ft.	12 Ft.	In.	Lin. Ft.	12 Ft.	In.	Lin. Ft.	12 Ft.	In.	Lin. Ft.	12 Ft.
1/8	.047	.56	1 1/2	6.828	81.94	1/4	.241	2.89	1/4	.241	2.89
5/16	.107	1.28	1 5/8	8.014	96.17	5/8	.543	6.52	5/8	.543	6.52
1/4	.190	2.28	1 3/4	9.294	111.53	7/16	.740	8.88	7/16	.740	8.88
5/16	.296	3.55	2	12.140	145.68	1/2	.966	11.59	5/8	1.509	18.11
3/8	.427	5.12	2 1/4	15.360	184.32	3/4	2.174	26.08	3/4	2.174	26.08
7/16	.581	6.97	2 1/2	18.970	227.64	1	3.864	46.37	1	3.864	46.37
1/2	.759	9.11	2 3/4	22.950	275.40	1 1/4	6.038	72.46	3/4	6.038	72.46
5/8	1.185	14.22	3	27.310	327.72	1 1/2	8.694	104.33	1 1/2	8.694	104.33
3/4	1.707	20.48	4	48.560	582.72	2	15.460	185.52	2	15.460	185.52
7/8	2.324	27.89	5†	75.87	910.44						
1	3.035	36.42	6†	109.3	1311.60						
1 1/8	3.841	46.09									
1 1/4	4.742	56.90									
1 3/8	5.738	68.86									

†Forged and Turned

LEADED COPPER RODS — Alloy No. 126

Lengths 12 Foot Random

ROUND

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1/8	.048	.576	5/16	.297	3.564
5/32	.074	.888	3/8	.427	5.124
3/16	.107	1.284	7/16	.583	6.996
1/4	.190	2.280	1/2	.761	9.132
19/64	.268	3.216	1 1/32	1.070	12.840

RECTANGULAR

3/8 x 1 1/32 In. Dimension — Approx. Wt. .500 Lb. per Ft., 6.00 Lbs. per 12 Ft.

HARD DRAWN CHROME COPPER ROD—Alloy No. 999

Lengths 12 Foot Random

ROUND

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
7/16	.581	6.972	1/2	.759	9.108

RECTANGULAR

3/8 x 1 1/32 In. Dimension — Approx. Wt. .500 Lb. per Ft., 6.00 Lbs. per 12 Ft.

ROUND COPPER FORGING BILLETS

This is an Oxygen Free High Conductivity (O.F.H.C.) Certified Copper Billet as cast.

Lengths 48 to 52 Inches Random

8 Inch Diameter — Approx. Wt. per Lin. Ft. 185.00 Lbs.

SOFT RECTANGULAR ROUND EDGE COPPER BUS BAR IN COILS

Coils—Approx. 28 In. O.D. and 10 In. I.D.

1/8 x 3/4 In. Dimension — Approx. Wt. per Lin. Ft. .362 Lb.

Rectangular Copper Bus Bars — Refer to Page 6

RECTANGULAR COPPER BUS BARS — Alloy No. 100**Square Edge (S) Round Edge (R) Radius Edge (RI)****Lengths 12 Foot Random**

Width Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Width Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.			
1/16 Inch Thick								
1/2 S.....	.121.....	1.45	2 S.....	2.42	29.04			
1 S.....	.241.....	2.89	5/16 Inch Thick					
3/32 Inch Thick								
1/2 S,R.....	.181.....	2.17	7/8 S.....	1.268.....	15.21			
3/4 S.....	.271.....	3.25	1 S,R.....	1.449.....	17.39			
1 S.....	.362.....	4.34	1 1/4 S.....	1.811.....	21.74			
1/8 Inch Thick								
3/8 S.....	.181.....	2.17	1 1/2 S.....	2.174.....	26.09			
1/2 S.....	.242.....	2.90	2 S,R.....	2.898.....	34.78			
5/8 S.....	.302.....	3.62	2 1/2 S.....	3.623.....	43.48			
3/4 S,R.....	.362.....	4.34	3 S,R.....	4.347.....	52.16			
7/8 S.....	.423.....	5.08	4 S.....	5.796.....	69.55			
1 S,R.....	.483.....	5.80	5 S.....	7.245.....	86.94			
1 1/4 S,R.....	.604.....	7.25	6 S.....	8.694.....	104.33			
1 1/2 S,R.....	.725.....	8.70	1/2 Inch Thick					
2 S.....	.966.....	11.59	3/4 S.....	1.449.....	17.39			
3 S.....	1.449.....	17.39	1 S.....	1.932.....	23.18			
4 S.....	1.932.....	23.18	1 1/4 S.....	2.415.....	28.98			
5 S.....	2.415.....	28.98	1 1/2 S.....	2.898.....	34.78			
3/16 Inch Thick								
1/2 S,R.....	.362.....	4.34	1 3/4 S.....	3.381.....	40.57			
5/8 S.....	.453.....	5.44	2 S.....	3.864.....	46.37			
3/4 S.....	.543.....	6.52	2 1/2 S.....	4.830.....	57.96			
1 S,R.....	.725.....	8.70	3 S.....	5.796.....	69.55			
1 1/8 R.....	.815.....	9.78	4 S.....	7.728.....	92.74			
1 1/4 S,R.....	.906.....	10.87	5 S.....	9.660.....	115.92			
1 1/2 S,R.....	1.087.....	13.04	6 S.....	11.590.....	139.08			
1 3/4 S,R.....	1.268.....	15.22	5/8 Inch Thick					
2 S.....	1.449.....	17.39	4 S.....	9.659.....	115.90			
3 S.....	2.174.....	26.08	3/4 Inch Thick					
1/4 Inch Thick								
3/8 S.....	.362.....	4.34	1 S.....	2.898.....	34.78			
1/2 S,R.....	.483.....	5.80	1 1/2 S.....	4.347.....	52.16			
5/8 S.....	.604.....	7.24	2 S.....	5.796.....	69.55			
3/4 S,R,RI.....	.725.....	8.70	3 S.....	8.694.....	104.33			
7/8 S,R.....	.845.....	10.14	4 S.....	11.590.....	139.08			
1 S,R.....	.966.....	11.59	1 Inch Thick					
1 1/4 S,R.....	1.208.....	14.50	1 1/2 S.....	5.796.....	69.55			
1 1/2 S,R.....	1.449.....	17.39	2 S.....	7.728.....	92.74			
1 3/4 S,R.....	1.691.....	20.29	3 S.....	9.660.....	115.92			
2 S,R.....	1.932.....	23.18	4 S.....	11.59.....	139.08			
2 1/4 R.....	2.170.....	26.04	6 S.....	23.18.....	278.16			
2 1/2 S,R.....	2.415.....	28.98	1 1/4 Inches Thick					
3 S,R.....	2.898.....	34.78	3 S.....	14.49.....	173.88			
3 1/4 S.....	3.140.....	37.68	4 S.....	19.32.....	231.84			
4 S,R.....	3.864.....	46.37	1 1/2 Inches Thick					
5 S,R.....	4.830.....	57.96	2 S.....	11.59.....	139.08			
6 S.....	5.796.....	69.55	3 S.....	17.39.....	208.68			
1 7/64 Inch Thick								
3 R.....	7.079.....	84.95	2 Inches Thick					
			3 S.....	23.18.....	278.16			
			4 S.....	30.92.....	371.04			
			5 S.....	38.50.....	462.00			

Soft Rectangular Round Edge Copper Bus Bar in Coils — Refer to Page 5

ROUND SEAMLESS COPPER TUBES**Hard Drawn — Outside Diameters — Alloy No. 103**

Alloy 103 Phosphorized Copper is pure electrolytically refined copper, deoxidized with phosphorus to remove oxides from the metal. Tubes of phosphorus-deoxidized copper have, for years, found wide and satisfactory applications in chemical and industrial heat exchangers, condensers and evaporators. They also are used in feed-water heaters and similar auxiliaries in stationary steam power plants and air-conditioning equipment.

Alloy 103 Phosphorized Copper Tubes are used in sugar house and refinery heaters and in calandria pans. They have high thermal conductivity and, therefore, are suitable for many industrial purposes where this property and corrosion resistance are desirable.

O.D. Inches	Stubs' Gage	Wall Thickness Dec. In.	I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
12 Foot Lengths					
1/8	22	.028	.069	.033	.40
3/16	20	.035	.117	.065	.78
5/16	22	.028	.131	.054	.65
1/4	18	.049	.152	.120	1.44
1/4	20	.035	.180	.092	1.10
5/16	20	.035	.242	.118	1.42
3/8	16	.065	.245	.245	2.94
3/8	18	.049	.277	.195	2.34
3/8	20	.035	.305	.145	1.74
1/2†	1/8"	.125	.250	.572	6.86
1/2	16	.065	.370	.344	4.13
1/2	18	.049	.402	.269	3.23
1/2	20	.035	.430	.198	2.38
5/8	16	.065	.495	.443	5.32
5/8	18	.049	.527	.344	4.13
5/8	20	.035	.555	.251	3.01
3/4	16	.065	.620	.542	6.50
3/4	18	.049	.652	.418	5.02
1	16	.065	.870	.740	8.88
1	18	.049	.902	.567	6.80
1	20	.035	.930	.411	4.93
1 1/4	16	.065	1.120	.938	11.26
1 1/2	16	.065	1.370	1.140	13.68
2	14	.083	1.834	1.940	23.28
2	16	.065	1.870	1.530	18.36
2 1/2	14	.083	2.334	2.440	29.28
20 Foot Lengths					
1	18	.049	.902	.567	11.34
2	14	.083	1.834	1.940	38.80
3	14	.083	2.834	2.948	58.96
4	14	.083	3.834	3.959	79.18

†Ordered to Inside Diameter and Wall Thickness Dec. In.

NEED MORE INFORMATION ABOUT COPPER AND COPPER ALLOYS?

Here is a list of literature available from our library covering detailed application and fabrication information on copper metals.

Just write or telephone us. We will be pleased to forward the literature you need.

List of Publications:

- B-3 MACHINING COPPER AND COPPER ALLOYS
- B-14 RODS FOR SCREW MACHINE PRODUCTS
- B-34 COPPER AND COPPER-ALLOY SPECIFICATIONS INDEX
- B-36 CORROSION RESISTANCE OF COPPER AND COPPER ALLOYS
- B-39 FORMBRITE, A NEW SUPERFINE-GRAIN DRAWING BRASS
- E-5 EVERDUR METAL — PROPERTIES AND APPLICATIONS
- E-13 EVERDUR METAL FOR TANKS AND EQUIPMENT

COPPER WATER TUBES — Alloy No. 103**Federal Spec. WW-T-799a and ASTM Spec. B88-55****Strong — Flexible — Rustproof — For Plumbing, Heating and Gas Lines****Type "K"—Recommended for underground service and general plumbing.****Type "L"—Suitable for all interior plumbing, also replacement work.**

Nominal Size Inches	O.D. Inches	Wall Thickness Dec. In.	I.D. Dec. In.	Approx. Wt., Lbs. per Lin. Ft.	per Coil
Type "K" Soft — 60 Foot Coils					
3/8	1/2	.049	.402	.269	16.14
1/2	5/8	.049	.527	.344	20.64
5/8	3/4	.049	.652	.418	25.08
3/4	7/8	.065	.745	.641	38.46
1	1 1/8	.065	.995	.839	50.34
1 1/4	1 1/8	.065	1.245	1.037	62.22

Type "K" Hard — 20 Foot Lengths					Length
3/8	1/2	.049	.402	.269	5.38
1/2	5/8	.049	.527	.344	6.88
5/8	3/4	.049	.652	.418	8.36
3/4	7/8	.065	.745	.641	12.82
1	1 1/8	.065	.995	.839	16.78
1 1/4	1 1/8	.065	1.245	1.037	20.74
1 1/2	1 1/8	.072	1.481	1.362	27.24
2	2 1/8	.083	1.959	2.064	41.28
2 1/2	2 1/8	.095	2.435	2.927	58.54
3	3 1/8	.109	2.907	4.003	80.06
3 1/2	3 1/8	.120	3.385	5.12	102.40
4	4 1/8	.134	3.857	6.51	130.20
5	5 1/8	.160	4.805	9.67	193.40
6	6 1/8	.192	5.741	13.90	278.00

Type "L" Hard — 20 Foot Lengths					Length
3/8	1/2	.035	.430	.198	3.96
1/2	5/8	.040	.545	.285	5.70
5/8	3/4	.042	.668	.362	7.24
3/4	7/8	.045	.785	.455	9.10
1	1 1/8	.050	1.025	.655	13.10
1 1/4	1 1/8	.055	1.265	.884	17.68
1 1/2	1 1/8	.060	1.505	1.143	22.86
2	2 1/8	.070	1.986	1.752	35.04
2 1/2	2 1/8	.080	2.465	2.479	49.58
3	3 1/8	.090	2.945	3.326	66.52
3 1/2	3 1/8	.100	3.425	4.29	85.80
4	4 1/8	.110	3.905	5.38	107.60
5	5 1/8	.125	4.875	7.61	152.20
6	6 1/8	.140	5.845	10.20	204.00

Type "L" Soft — 60 Foot Coils					Coil
3/8	1/2	.035	.430	.198	11.88
1/2	5/8	.040	.545	.285	17.10
5/8	3/4	.042	.666	.362	21.72
3/4	7/8	.045	.785	.455	27.30
1	1 1/8	.050	1.025	.655	39.30
1 1/4	1 1/8	.055	1.265	.884	53.04

§ Also Stocked in Soft Temper

ROUND SEAMLESS COPPER REFRIGERATION TUBING**Alloy No. 103 — Soft Drawn — Outside Diameters****SEALED AND DRIED — Sold Only in Full Coils, 50 Feet**

O.D. Inches	Wall Thickness Dec. In.	I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 50 Ft. Coils
1/8	.030	.065	.035	1.75
3/16	.030	.128	.057	2.88
1/4	.030	.190	.080	4.02
5/16	.032	.249	.109	5.45
3/8	.032	.311	.134	6.70
1/2	.032	.436	.182	9.10
5/8	.035	.555	.251	12.55
3/4	.035	.680	.305	15.25

ROUND SEAMLESS COPPER TUBING**Alloy No. 103 — Soft Drawn — Outside Diameters****Sold Only in Full Coils, 50 Feet**

O.D. Inches	Wall Thickness Dec. In.	I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 50 Ft. Coils
OPEN END TUBING — Type N — Spec. WWT-799-a				
3/16	.035	.118	.065	3.25
1/4	.035	.180	.092	4.58
5/16	.035	.243	.118	5.90
3/8	.035	.305	.145	7.25
1/2	.035	.430	.198	9.90

OPEN END TUBING

1/4	.025	.200	.068	3.40
1/4	.049	.152	1.199	6.00
5/16	.025	.263	.087	4.35
3/8	.025	.325	.107	5.35

ROUND SEAMLESS COPPER PIPE**Alloy No. 100 — Hard Drawn****Stock Lengths 20 Feet**

Pipe Size Inches	I.D. Dec. In.	Wall Thickness Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 20 Ft.
STANDARD PIPE SIZES					
1/8	.281	.062	.405	.259	5.18
1/4	.375	.082	.540	.460	9.19
3/8	.494	.090	.675	.644	12.88
1/2	.625	.107	.840	.959	19.18
5/8	.822	.114	1.050	1.299	25.98
1	1.062	.126	1.315	1.831	36.62
1 1/4	1.368	.146	1.660	2.692	53.84
1 1/2	1.600	.150	1.900	3.196	63.92
2	2.062	.156	2.375	4.228	84.56
2 1/2	2.500	.187	2.875	6.136	122.72
3	3.062	.219	3.500	8.750	175.00
3 1/2	3.500	.250	4.000	11.420	228.00
4	4.000	.250	4.500	12.940	258.80
5	5.062	.250	5.563	16.200	324.00
6	6.125	.250	6.625	19.410	388.20

EXTRA HEAVY

1/8	.205	.100	.405	.371	7.42
1/4	.294	.123	.540	.625	12.50
3/8	.421	.127	.675	.848	16.96
1/2	.542	.149	.840	1.254	25.08
5/8	.736	.157	1.050	1.707	34.14
1	.951	.182	1.315	2.511	50.22
1 1/4	1.272	.194	1.660	3.463	69.26
1 1/2	1.494	.203	1.900	4.195	83.90
2	1.933	.221	2.375	5.797	115.94
2 1/2	2.315	.280	2.875	8.848	176.96
3	2.892	.304	3.500	11.830	236.60
4	3.818	.341	4.500	17.270	345.40

THREADLESS TYPE "TP"

1/4	.410	.065	.540	.376	7.52
3/8	.545	.065	.675	.483	9.66
1/2	.710	.065	.840	.613	12.26
5/8	.920	.065	1.050	.780	15.60
1	1.185	.065	1.315	.989	19.78
1 1/2	1.770	.065	1.900	1.45	29.00
2	2.245	.065	2.375	1.83	36.60
2 1/2	2.745	.065	2.875	2.22	44.40

COPPER BASE ALLOYS**SPECIFICATIONS**

*The specifications marked with an asterisk are the specifications to which the material is ordered and to which we can furnish test reports.

FED.	{ QQ-B-613A QQ-B-626A QQ-B-637 QQ-B-637 *MIL-B-6946 *MIL-C-17516,	Half Hard Sheet Brass (Commercial) Brass Rod Tobin Bronze Rod..... Naval Brass Rod..... Everdur 1014 Everdur 1010 Rod only.....	Comp. 2 Comp. 22 Comp. 1 Comp. 1 Grade B Comp. 1
FED.	QQ-P-330	Spring Phosphor Bronze Sheets.....	Grade A
FED.	{ QQ-W-321B QQ-W-401 WW-P-351 QQ-B-613A QQ-B-613A *ASTM-B-171-55 ASTM-B-96	Soft Brass Wire..... Spring Phosphor Bronze Wire..... Red Brass Pipe..... Spring Sheet Brass..... Soft Roll Brass Naval Brass Plate..... 1010 — Everdur Sheet.	Comp. B Grade A Grade A Comp. 2 Comp. 2 Comp. A7

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HALF HARD BRASS SHEETS

Alloy No. 42 — Non-Leaded

Stock Lengths 8 Feet

Dec. Inch Thick	Width Inches	Approx. Wt. Lbs. per Sheet	Dec. Inch Thick	Width Inches	Approx. Wt. Lbs. per Sheet
	Sq. Ft.			Sq. Ft.	
1.500	†24	66.08 . . . 528.64	.063	10	2.83 . . . 18.87
				12	2.83 . . . 22.64
1.000	12	44.06 . . . 352.48		14	2.83 . . . 26.41
	36	44.06 . . . 1057.54		16	2.83 . . . 30.19
.750	12	33.05 . . . 264.40		18	2.83 . . . 33.96
	36	33.05 . . . 793.20		20	2.83 . . . 37.73
.625	12	27.54 . . . 220.32	.050	24	2.83 . . . 45.28
	36	27.54 . . . 660.96		4	2.24 . . . 5.97
.500	12	22.03 . . . 176.24		8	2.24 . . . 11.94
	36	22.03 . . . 528.72		12	2.24 . . . 17.92
.375	12	16.52 . . . 132.16		14	2.24 . . . 20.91
	36	16.52 . . . 396.48		16	2.24 . . . 23.89
.3125	24	13.80 . . . 220.80		18	2.24 . . . 26.88
	36	13.80 . . . 331.20		20	2.24 . . . 29.87
.250	12	11.02 . . . 88.16	.040	24	2.24 . . . 35.84
	24	11.02 . . . 176.32		4	1.78 . . . 4.75
	36	11.02 . . . 264.48		8	1.78 . . . 9.49
.1875	12	8.26 . . . 66.10		10	1.78 . . . 11.87
	14	8.26 . . . 77.08		12	1.78 . . . 14.24
	16	8.26 . . . 88.12		14	1.78 . . . 16.61
	18	8.26 . . . 99.14		16	1.78 . . . 18.99
	24	8.26 . . . 132.16		18	1.78 . . . 21.36
.125	4	5.51 . . . 14.69	.032	20	1.78 . . . 23.73
	6	5.51 . . . 22.04		24	1.78 . . . 28.48
	8	5.51 . . . 29.38		6	1.41 . . . 5.64
	10	5.51 . . . 36.73		8	1.41 . . . 8.46
	12	5.51 . . . 44.08		12	1.41 . . . 11.28
	14	5.51 . . . 51.42		14	1.41 . . . 13.15
	16	5.51 . . . 58.77		16	1.41 . . . 15.03
	18	5.51 . . . 66.12		18	1.41 . . . 16.92
	24	5.51 . . . 88.12		20	1.41 . . . 18.79
	‡48	5.51 . . . 220.40		24	1.41 . . . 22.56
.0937	24	4.13 . . . 66.08	.025	12	1.12 . . . 8.96
.090	12	3.97 . . . 31.76		14	1.12 . . . 10.45
.080	10	3.56 . . . 23.74		16	1.12 . . . 13.44
	12	3.56 . . . 28.48		18	1.12 . . . 17.92
.063	6	2.83 . . . 11.32	.020	12	.89 . . . 7.12
	8	2.83 . . . 15.09		14	.89 . . . 8.31
				16	.89 . . . 9.49
				18	.89 . . . 10.68
				24	.89 . . . 14.24
			.016	12	.70 . . . 5.60
			.013	12	.56 . . . 4.48

§Patent Leveled and Resquared †4 Ft. Long ‡10 Ft. Long

HALF HARD BRASS IN ROLLS — Alloy No. 42

12 Inches Wide — 500 to 600 Lb. Coils

Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
.063	.2825	.025	.1119
.050	.2238	.020	.886
.040	.1776	.016	.700
.032	.1410	.013	.555

HALF-HARD SHIM BRASS

PACKAGED — 6 x 100 Inch Rolls

Thickness No.	Dec. In.	Approx. Wt. Lbs. per Foot	Thickness No.	Dec. In.	Approx. Wt. Lbs. per Foot
		per Roll			per Roll
S-1.....	.001.....	.022.....	S-8.....	.008.....	.176.....
S-1X.....	.0015.....	.033.....	S-9.....	.009.....	.198.....
S-2.....	.002.....	.044.....	S-10.....	.010.....	.220.....
S-3.....	.003.....	.066.....	S-12.....	.012.....	.278.....
S-4.....	.004.....	.088.....	S-15.....	.015.....	.330.....
S-5.....	.005.....	.110.....	S-20.....	.020.....	.441.....
S-6.....	.006.....	.132.....	S-25.....	.025.....	.450.....
S-7.....	.007.....	.154.....	S-31.....	.031.....	.666.....
					5.500.....

QUARTER-HARD SHIM BRASS

BULK — Rolls 6 Inches Wide

Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per Roll
.001.....	.022.....	10 to 20
.002.....	.044.....	10 to 20
.003.....	.066.....	10 to 20

QUARTER-HARD LEADED BRASS SHEETS—Alloy No. 246

Stock Lengths 8 Feet — 12 Inches Wide

Inches	Thickness Dec. In.	Approx. Wt. Lbs. per Sq. Ft.	Inches	Thickness Dec. In.	Approx. Wt. Lbs. per Sq. Ft.
1/4.....	.2500.....	11.02	1/2.....	.5000.....	22.03
5/16.....	.3125.....	13.77	3/4.....	.7500.....	33.05
3/8.....	.3750.....	16.52	1.....	1.0000.....	44.06

HALF-HARD LEADED BRASS SHEETS—Alloy No. 246

Stock Lengths 8 Feet

Inches	Thickness Dec. In.	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Inches	Thickness Dec. In.	Width Inches	Approx. Wt. Lbs. per Sq. Ft.
1/8.....	.125.....	12.....	5.51	1/4.....	.250.....	12.....	11.02
1/8.....	.125.....	14.....	5.51	3/8.....	.375.....	12.....	16.52
3/16.....	.187.....	12.....	8.26	1/2.....	.500.....	12.....	22.03

SPRING BRASS SHEETS—Alloy No. 42

12 Inches Wide — Lengths 8 Feet

Dec. In. Thick	Approx. Wt. Lbs. per Sq. Ft.	Sheet	Dec. In. Thick	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.0641.....	2.825.....	22.60	.0250.....	1.119.....	8.95
.0400.....	1.776.....	14.21	.0100.....	.441.....	3.53
.0320.....	1.410.....	11.28	.0080.....	.353.....	2.82

SOFT BRASS SHEETS—Alloy No. 42

Stock Lengths 8 Feet — 12 Inches Wide

Thickness Dec. In.	Approx. Wt. Lbs. per Sq. Ft.	Sheet	Thickness Dec. In.	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.101.....	4.490.....	35.92	.050.....	2.238.....	17.90
.080.....	3.560.....	28.48	.040.....	1.776.....	14.21
.063.....	2.825.....	22.60	.032.....	1.410.....	11.28

SOFT ROLL BRASS — Alloy No. 42

Suitable for Spinning, Stamping and Drawing

.050 to .016 Dec. In. incl. — Rolls 500 to 600 Pounds

.0159 to .005 Dec. In. incl. — Coils 75 to 100 Pounds

Dec. Inch Thick	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.	Dec. Inch Thick	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.
.050	12	2.238	2.238	.025	14	1.119	1.305
	14	2.238	2.611		16	1.119	1.492
.040	12	1.776	1.776		18	1.119	1.679
	14	1.776	2.072	.020	10	.886	.738
	16	1.776	2.368		12	.886	.886
	18	1.776	2.664		14	.886	1.034
.032	10	1.410	1.175		16	.886	1.181
	12	1.410	1.410	.016	12	.701	.701
	14	1.410	1.645		14	.701	.818
	16	1.410	1.880	.013	12	.555	.555
	18	1.410	2.116	.010	12	.441	.441
.025	6	1.119	.559	.008	12	.353	.353
	10	1.119	.933		12	.220	.220
	12	1.119	1.119	.005	12	.220	.220

MUNTZ METAL SHEETS (YELLOW METAL)

Alloy No. 66

Dec. Inch Thick	Dimen- sions Inches	Approx. Wt. Lbs. per Sheet	Dec. Inch Thick	Dimen- sions Inches	Approx. Wt. Lbs. per Sheet		
1.000	36x96	43.63	1047.07	.1875	24x48	8.26	66.10
.750	36x96	32.73	785.42		36x96	8.26	198.24
.500	24x96	22.03	352.48	.125	36x96	5.51	132.19
	30x96	22.03	440.60		48x96	5.51	176.26
	36x96	22.03	528.72	.093	36x96	4.13	99.12
.375	24x48	16.52	132.16	.063	36x96	2.83	67.80
	30x96	16.52	330.40		36x120	2.83	84.75
.3125	24x48	13.77	110.16	.050	36x96	2.24	53.76
	30x96	13.77	275.40	.040	36x96	1.78	42.48
.250	30x96	11.02	220.40	.032	36x96	1.41	33.84
	36x96	11.02	264.48				

HOT ROLLED NAVAL BRASS SHEETS AND PLATES

Alloy No. 450 — Spec. ASTM-B171-55

Thick- ness Inches	Dimen- sion Inches	Approx. Wt. Lbs. per Sheet	Thick- ness Inches	Dimen- sion Inches	Approx. Wt. Lbs. per Sheet		
1/6	36x120	2.91	87	1	36x96	44.00	1052
1/8	48x96	5.50	176	1 1/4	36x96	55.00	1320
3/16	36x96	8.25	198	1 1/2	36x96	66.00	1584
1/4	36x96	11.00	264	1 3/4	48x96	77.00	2464
5/16	36x96	16.50	396	2	48x96	88.00	2816
1/2	36x96	22.00	528	2 1/4	48x96	99.00	3168
5/8	36x96	27.50	660	2 1/2	48x96	110.00	3520
3/4	36x96	33.00	792				

HALF HARD PERFORATED BRASS SHEETS

Sheet Size 12x72 Inches

Mesh No.	Pattern	Holes per Sq. In.	B&S Gage	Hole Diameter Inches	Thickness Dec. In.	Approx. Wt. Lbs. per Sq. Ft.
1	Square	400	26	.027	.0159	.45
2	Square	324	26	.033	.0159	.45
4	Square	225	24	.045	.0201	.60
6	Square	144	24	.050	.0201	.60

EVERDUR SHEETS — Alloy No. 1010**Hot Rolled, Annealed, Plain Pickled**Lighter than $\frac{1}{8}$ " thick — Spec. ASTM-B97 Alloy A7 $\frac{1}{8}$ " and thicker — Spec. ASTM-B96 Alloy A7

Approx. 96% Copper, 3% Silicon, 1% Manganese

Made from processed alloys of copper with silicon and other metals, and have approximately the physical properties of steel. Everdur is highly corrosion resistant to most acids and alkaline liquids.

Gage No. or Inches	Thickness Dec. In.	Dimensions Inches	Approx. Wt. Lbs. per Sheet
14 B&S.	.0641	48x96	2.843 90.98
10 B&S.	.1019	48x96	4.519 144.61
$\frac{1}{8}$ "	.1250	48x120	5.540 221.60
$\frac{1}{8}$ "	.1250	60x96	5.540 221.60
8 B&S.	.1285	48x96	5.699 182.37
10 Stubs'	.1340	60x96	6.276 251.04
7 B&S.	.1443	48x96	6.400 204.80
7 B&S.	.1443	60x120	6.400 320.00
$\frac{3}{16}$ "	.1875	48x96	8.316 266.11
$\frac{3}{16}$ "	.1875	60x96	8.316 332.64
$\frac{3}{16}$ "	.1875	60x120	8.316 415.80
$\frac{1}{4}$ "	.2500	48x120	11.090 443.60
$\frac{1}{4}$ "	.2500	60x96	11.090 443.60
$\frac{3}{8}$ "	.3750	48x120	16.630 665.20

HALF HARD RED BRASS SHEETS**Rich Low 85% — Alloy No. 24**

Stock Lengths 10 Feet Exact — Patent Leveled and Resquared

Width Inches	Approx. Wt. Lbs. per Sheet	Width Inches	Approx. Wt. Lbs. per Sheet
$\frac{1}{8}$ In. (.125 Dec. In.)		.032 Dec. In. (No. 20 B&S Ga.)	
12	5.69 56.90	12	1.46 14.60
.063 Dec. In. (No. 14 B&S Ga.)		16	1.46 19.46
16	2.92 38.93	.025 Dec. In. (No. 22 B&S Ga.)	
.040 Dec. In. (No. 18 B&S Ga.)		14	1.16 13.53
12 $\frac{1}{2}$	1.83 14.64		

 $\frac{3}{8}$ Foot Lengths**HALF HARD COMMERCIAL BRONZE SHEETS****Alloy No. 14**

Stock Lengths 8 Feet

Thickness Dec. In.	B&S Gage	Width	Approx. Wt. Lbs. per Sheet
.050	16	10	2.325 15.49
.050	16	12	2.325 18.60
.032	20	12	1.465 11.72

PROBLEMS WITH COPPER AND COPPER BASE ALLOYS?

If you roll, bend, machine, weld, punch or fabricate copper alloys you probably run into problems.

Our trained product specialists and metallurgists are ready to help you.

Feel free to call upon them for assistance in solving problems relating to copper, brass, bronze and other copper base alloys.

GRADE "A" SPRING PHOSPHOR BRONZE SHEETS

Alloy No. 351

6 Inches Wide — 8 Foot Lengths

A copper-tin alloy from which the oxides have been eliminated by the addition of phosphorus. A fine grain homogeneous metal possessing high tensile strength, high elastic limits, high resistance to fatigue, corrosion and wear and a low coefficient of friction.

Approx. Wt. Lbs. per Sheet				Approx. Wt. Lbs. per Sheet			
Thickness Dec. In.	Ga. or In.	Sq. Ft.		Thickness Dec. In.	Ga. or In.	Sq. Ft.	
.125	1/8"	5.760	22.40	.032	20 B&S	1.474	5.90
.0907	11 B&S	3.990	21.27	.025	22 B&S	1.1700	4.68
.080	12 B&S	3.723	14.89	.020	24 B&S . . . . .	.9262	3.70
.064	14 B&S	2.954	11.82	.016	26 B&S . . . . .	.7326	2.93
.050	16 B&S	2.340	9.36	.013	28 B&S . . . . .	.5806	2.32
.040	18 B&S	1.857	7.43	.010	30 B&S . . . . .	.4607	1.84

‡8 Inches Wide

HYDRO-T-METAL SHEETS

Hydro-T-Metal is an alloy of zinc, copper and titanium. It is 16% lighter in weight than brass, 20% lighter than copper and 10% lighter than stainless steel. This metal resists stretching or sagging under tension or temperature change, thus counteracting the tendency that has limited zinc-based alloys as structural materials.

PHYSICAL PROPERTIES

Density — lbs. per cubic in.	0.258
Melting point — °F	792
Specific heat, BTU/lb. 68-212°F	0.096
Coeff. of expansion per °F	0.0000128"
Electrical conductivity, copper = 100	27%

MINIMUM MECHANICAL PROPERTIES

Tensile Strength, PSI	24,000
Elongation in 2 in., %	10
Rockwell hardness, (15T)	62
Bends (flat back on itself)	180°
Creep rate, expressed as no. of days at 70°F under stress of 8,000 PSI to produce 1% elongation	714

• EASY TO WORK

- Solders easily
- Can be fusion welded
- Can be deep drawn without work hardening or annealing
- Excellent for severe forming
- Machines well
- Can be readily spun, extruded, stamped, coined, embossed and perforated
- Takes nickel and chrome plating
- Can be highly polished
- Self lubricating
- Will not weather-stain surrounding areas
- High corrosion resistance
- Can be buried in concrete and earth without protection
- Easily color coated
- Non-magnetic, excellent for shielding
- Non-sparking
- Light weight

Dec. In. Thick	Size Inches	Approx. Wt. Lbs. per Sheet
	Sq. Ft.	
.020	36x96 . . . . .	.744
.020	36x120 . . . . .	.744
.025	36x96 . . . . .	.940
.027	36x120	1.030
.032	36x96	1.184
		17.86 22.32 22.56 30.90 28.42

Dec. In. Thick	Size Inches	Approx. Wt. Lbs. per Sheet
	Sq. Ft.	
.040	36x96	1.492
.050	36x96	1.879
.063	36x96	2.310
.125	36x96	4.626
		35.81 45.10 55.44 111.02

FREE TURNING BRASS RODS

Alloy No. 271 — Half Hard Drawn

Stock Lengths 12 Feet Random

Free Turning Brass Rod is a standard product composed of pure copper, zinc and lead, correctly alloyed, wrought and finished to produce the most desirable machining qualities.

ROUND (Spec. QQ-B-626A—Comp. 22)

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1/16	.0113	.136	1 5/16	4.984	59.81
5/32	.0255	.31	1 3/8	5.470	65.64
1/8	.0452	.54	1 7/16	5.979	71.75
5/16	.0579	.69	1 1/2	6.510	78.12
7/32	.0707	.85	1 1/16	7.064	84.77
11/64	.0862	1.03	1 5/8	7.640	91.68
3/16	.1017	1.22	1 11/16	8.239	98.87
13/64	.119	1.43	1 3/4	8.861	106.33
7/32	.1385	1.66	1 13/16	9.505	114.06
15/64	.1695	2.03	1 7/8	10.17	122.04
1/4	.1808	2.17	1 15/16	10.88	130.56
5/32	.2290	2.75	2	11.57	138.84
3/16	.2826	3.39	2 1/8	13.07	156.84
11/32	.3420	4.10	2 1/4	14.65	175.80
3/8	.4069	4.88	2 3/8	16.32	195.84
13/32	.4776	5.73	2 1/2	18.08	216.96
7/16	.5538	6.65	2 5/8	19.94	239.28
15/32	.6359	7.62	2 3/4	21.88	262.56
1/2	.7234	8.68	2 7/8	23.90	287.00
17/32	.8167	9.80	3	26.04	312.48
9/16	.9155	10.99	3 1/4	30.56	366.72
19/32	1.020	12.24	3 1/2	35.45	425.40
5/8	1.130	13.56	3 3/4	40.70	488.40
11/16	1.368	16.42	4	46.30	555.60
3/4	1.628	19.54	4 1/4	51.80	621.60
13/16	1.910	22.92	4 1/2	58.60	703.20
7/8	2.215	26.58			
15/16	2.543	30.52			
1	2.893	34.72			
1 1/16	3.266	39.19	5	72.34	868.08
1 1/8	3.662	43.94	5 1/2	87.50	1050.00
1 3/16	4.080	48.96	6	104.21	1250.52
1 1/4	4.521	54.25	7	142.00	1704.00
			8	184.56	2214.72

HEXAGON (Spec. QQ-B-626A—Comp. 22)

3/16	.112	1.34	1 1/16	3.602	43.22
1/4	.199	2.39	1 1/8	4.038	48.46
5/16	.312	3.74	1 1/4	4.985	59.82
3/8	.449	5.39	1 5/16	5.496	65.95
7/16	.611	7.33	1 3/8	6.032	72.38
1/2	.798	9.58	1 1/2	7.178	86.14
9/16	1.009	12.11	1 5/8	8.425	101.10
5/8	1.246	14.95	1 3/4	9.771	117.25
11/16	1.508	18.10	1 7/8	11.22	134.64
3/4	1.795	21.54	2	12.76	153.12
13/16	2.106	25.27	2 1/4	16.15	193.80
7/8	2.443	29.32	2 1/2	19.94	239.28
15/16	2.804	33.65	2 3/4	24.10	288.00
1	3.190	38.28	3	28.71	344.52

SQUARE (Spec. QQ-B-626A—Comp. 22)

1/8	.0576	.69	7/8	2.821	33.85
3/16	.1295	1.55	1	3.684	44.21
1/4	.2303	2.76	1 1/8	4.663	55.96
5/16	.3598	4.32	1 1/4	5.756	69.07
3/8	.5181	6.22	1 3/8	6.965	83.58
7/16	.7051	8.46	1 1/2	8.289	99.47
1/2	.9210	11.05	1 5/8	9.728	116.74
9/16	1.1660	13.99	1 3/4	11.280	135.36
5/8	1.4390	17.27	2	14.740	176.88
3/4	2.072	24.86	2 1/2	23.024	276.29

RECTANGULAR BRASS STRIPS AND RODS

Stock Lengths 12 Feet Random

Width Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Width Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
STRIPS — HALF HARD — Alloy No. 42					
1/16 Inch Thick					
1/4	.058	.696	1	.230	2.760
3/8	.086	1.032	1 1/2	.345	4.140
1/2	.115	1.380	2	.461	5.532
5/8	.173	2.076			

FREE TURNING RODS — HALF HARD DRAWN

Alloy No. 243

3/32 Inch Thick

1/4	.086	1.032
3/8	.129	1.548
5/8	.216	2.592
3/4	.259	3.108
1 1/4	.432	5.184
1 1/2	.518	6.216
1 3/4	.604	7.248

1/8 Inch Thick

1/4	.115	1.380
3/8	.173	2.076
1/2	.230	2.760
5/8	.287	3.444
3/4	.345	4.140
7/8	.403	4.836
1	.461	5.532
1 1/8	.518	6.216
1 1/4	.576	6.912
1 1/2	.691	8.292
1 3/4	.806	9.672
2	.921	11.052
2 1/2	1.151	13.812
3	1.382	16.584
4	1.842	22.104

Alloy No. 271

3/16 Inch Thick

3/8	.259	3.108
1/2	.345	4.140
5/8	.432	5.184
3/4	.518	6.216
7/8	.604	7.248
1	.691	8.292
1 1/4	.863	10.356
1 1/2	1.037	12.444
1 3/4	1.209	14.508
2	1.382	16.584
3	2.072	24.864
4	2.763	33.156

1/4 Inch Thick

3/8	.345	4.140
1/2	.461	5.532
5/8	.576	6.912
3/4	.691	8.292
7/8	.806	9.672
1	.921	11.052
1 1/4	1.151	13.812
1 1/2	1.382	16.584
1 3/4	1.612	19.344
2	1.842	22.104

Alloy No. 271
1/4 Inch Thick (cont.)

3	.2763	33.156
4	3.680	44.210
6	5.510	66.120

5/16 Inch Thick

3/4	.864	10.368
1	1.151	13.812
1 1/4	1.439	17.268
1 1/2	1.727	20.724
2	2.303	27.636

3/8 Inch Thick

1/2	.691	8.292
5/8	.863	10.356
3/4	1.036	12.432

1	1.382	16.584
1 1/4	1.727	20.724
1 1/2	2.072	24.864
2	2.763	33.152

1/2 Inch Thick

5/8	1.151	13.812
3/4	1.382	16.584
7/8	1.612	19.344

1	1.842	22.104
1 1/4	2.303	27.636
1 1/2	2.763	33.156
1 3/4	3.224	38.688

5/8 Inch Thick

3/4	1.727	20.724
1	2.302	27.624
1 1/4	2.878	34.536
1 1/2	3.454	41.448
1 3/4	4.029	48.348

2	4.605	55.260
3/4 Inch Thick		

1	2.763	33.156
1 1/4	3.454	41.448
1 1/2	4.145	49.740

1 Inch Thick

1 1/2	5.526	66.312
2	7.340	88.080
3	11.052	132.624
4	14.736	176.832

†Alloy No. 246

HALF ROUND AND HALF OVAL BRASS RODS**Alloy No. 271 — HARD DRAWN, FREE TURNING***Stock Lengths 12 Feet Random*

Width Inches	Thickness Inch	Approx. Wt. Lbs. per Lin. Ft.	Width Inches	Thickness Inch	Approx. Wt. Lbs. per Lin. Ft.
				12 Ft.	
HALF ROUNDS					
3/8	x 3/16	.204	2.448	3/4	x 3/8
1/2	x 1/4	.362	4.344		

HALF OVALS

1/2	x 1/8	.1611	1.933	7/8	x 3/16	.5460	6.552
3/4	x 3/16	.3780	4.536	1	x 1/4	.6615	7.938
3/4	x 1/4	.5050	6.060	1 1/2	x 3/8	1.4480	17.380

ARCHITECTURAL BRONZE ANGLES**EXTRUDED — Alloy No. 280***Stock Lengths 12 Feet Random*

Dim. Outside Inches	Approx. Wt. Lbs. per Lin. Ft.	Dim. Outside Inches	Approx. Wt. Lbs. per Lin. Ft.
1/8 Inch (.125 Decimal Inch) Thick			
1/2 x 1/2	.42	5.04	1 x 1
5/8 x 5/8	.52	6.24	1 1/4 x 1 1/4
3/4 x 3/4	.64	7.68	1 1/2 x 1 1/2
7/8 x 7/8	.75	9.00	2 x 2
1/4 Inch (.250 Decimal Inch) Thick			
2 x 2	3.42	41.04	2 1/2 x 2 1/2
			4.33
			51.96

NAVAL BRASS RODS — Alloy No. 450**Spec. QQ-B-637, Comp. 1***Stock Lengths 12 Feet Random*

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — HARD DRAWN			
1/4	.179	2.15	7/8
5/16	.280	3.36	1
3/8	.403	4.84	1 1/8
7/16	.548	6.58	1 1/4
1/2	.716	8.59	1 5/16
9/16	.907	10.88	1 3/8
5/8	1.119	13.43	1 1/2
1 1/16	1.354	16.25	1 5/8
3/4	1.612	19.34	1 3/4
1 3/16	1.891	22.69	

ROUND — HALF HARD

2	11.460	137.52	3	25.790	309.48
2 3/16	13.700	164.40	3 1/4	30.260	363.12
2 1/4	14.500	174.00	3 1/2	35.100	421.20
2 5/8	16.160	193.92	4	45.840	550.00
2 1/2	17.910	214.92	4 1/8	48.000	576.00
2 5/8	19.740	236.88	4 1/4	51.800	621.60
2 3/4	21.670	260.04	4 1/2	58.000	696.00

HEXAGON—HALF HARD

7/16	.605	7.26	1 1/4	4.936	59.23
3/4	1.777	21.32	1 3/8	5.973	71.61
7/8	2.419	29.03	1 1/2	7.108	85.30
1	3.159	37.91	1 5/8	8.342	100.10
1 1/8	3.998	47.98	2	12.640	151.68

SQUARE—HALF HARD

3/4	2.052	24.62	1	3.648	43.78
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ROUND TOBIN BRONZE RODS — Alloy No. 452

Tobin bronze has high tensile strength, high yield strength, toughness, resilience and fatigue and corrosion resistance. Especially suitable for propeller shafting, turnbuckle barrels and marine hardware.

SPEC. QQ-B-637, COMP. 1 — HARD DRAWN

Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	Length	Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	Length
Stock Lengths 12 Feet Random					
5/16	.280	3.36	3/4	1.612	19.34
3/8	.403	4.84	1 1/16	1.891	22.69
1/2	.716	8.59	7/8	2.194	26.33
5/8	1.119	13.43			

Stock Lengths 20 Feet Random

1	2.865	57.30	1 1/8	10.07	201.40
1 1/8	3.626	72.52	2	11.46	229.20
1 1/4	4.477	89.54	2 1/4	14.50	290.00
1 3/8	5.417	108.34	2 3/8	16.16	323.20
1 1/2	6.447	128.94	2 1/2	17.91	358.20
1 5/8	7.566	151.32	2 3/4	21.67	433.40
1 3/4	8.774	175.48	3	25.79	515.80

COMMERCIAL QUALITY — HARD DRAWN**Turned and Specially Straightened for Shafting**

Diam. Inches	Stock Lgth. Ft.	Approx. Wt. Lbs. per Lin. Ft.	Length	Diam. Inches	Stock Lgth. Ft.	Approx. Wt. Lbs. per Lin. Ft.	Length
2	16	11.46	183.36	3 3/4	20	40.29	805.80
2	20	11.46	229.20	4	20	45.84	916.80
2 1/2	20	17.91	358.20	4 1/2	16	58.02	928.32
2 3/4	15	21.67	325.05	4 1/2	20	58.02	1,160.40
3 1/4	20	30.26	605.20	4 3/4	20	64.64	1,292.80
3 1/2	20	35.10	702.00	5	20	71.63	1,432.60

ROUND LEADED COMMERCIAL BRONZE RODS**HALF HARD DRAWN — Alloy No. 202****Stock Lengths 12 Feet Random**

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1/8	.047	.564	5/32	.074	.888

TELNIC BRONZE RODS — Hard Drawn**Stock Lengths 12 Feet Random**

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
5/32	.027	.324	1/8	.048	.576

ROUND PHOSPHOR BRONZE RODS**Alloy No. 610 — Spec. ASTM-B-139-B2**

Used where strength and bearing properties are indicated—excellent corrosion resistance and machinability. Used for bushings, bearings, shafts, gears, pinions, etc.

Stock Lengths 12 Feet Random

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1 1/8	3.81	45.72	1 1/4	4.71	56.52

Alloy No. 1010—EVERDUR (Cold Heading) RODS

ROUND — Spec. MIL-C-17516, Comp. 1

Approx. 95.8% Copper, 3.1% Silicon, 1.1% Manganese

Stock Lengths 12 Feet Random

Diam. Inch	Wt. Lbs. per Lin. Ft.	Wt. Lbs. per 12 Ft. Length	Diam. Inch	Wt. Lbs. per Lin. Ft.	Wt. Lbs. per 12 Ft. Length
3/8	.408	4.90	3/4	1.63	19.56
1/2	.726	8.71	7/8	2.22	26.64
5/8	1.13	13.56	1	2.90	34.80

Alloy No. 1012 — ROUND EVERDUR ROD FREE TURNING

Not Recommended for Hot Working

Approx. 95.6% Copper, 3% Silicon, 1% Manganese, .4% Lead

Made from processed alloys of copper with silicon and other metals, and have approximately the physical properties of steel. Will resist corrosion by many kinds of acids and alkaline liquids. For screw machine work.

Stock Lengths 12 Feet Random

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 12 Ft.
3/16	.102	1.22	7/8	2.222	26.66
5/16	.284	3.41	1	2.903	34.84
3/8	.408	4.90	1 1/4	4.536	54.43
1/2	.726	8.71	1 3/8	5.488	65.86
5/8	1.134	13.61	1 1/2	6.531	78.37
3/4	1.633	19.60			

ALUMINUM BRONZE (Everdur 1014) ROUND RODS

Spec. MIL-B-6946

Stock Lengths 12 Feet Random

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Approx. Wt. Lbs. per 12 Ft.
3/8	.368	4.42	1 5/16	4.514	54.17
7/16	.501	6.01	1 3/8	4.953	59.44
1/2	.655	7.86	1 1/2	5.895	70.74
9/16	.829	9.95	1 5/16	6.397	76.76
5/8	1.024	12.28	1 3/8	6.918	83.02
11/16	1.238	14.85	1 3/4	8.024	96.29
3/4	1.474	17.66	1 7/8	10.210	121.52
13/16	1.729	20.75	2	10.479	125.75
7/8	2.006	24.07	2 1/8	11.833	142.00
1	2.620	31.44	2 1/4	13.268	159.22
1 1/8	3.316	39.79	2 1/2	16.373	196.48
1 1/4	4.094	49.13	2 3/4	19.812	237.74

CAN FURNISH CHEMICAL TEST REPORTS ONLY

3 23.59 283.08 | 3 1/2 32.09 385.08

SOFT BRASS WIRE—Alloy No. 42

Random Weight Coils

B&S Gage or Inches	Diameter Dec. In.	Approx. Wt. Lbs. per 100 Ft.	Number Feet in 1 Lb.	B&S Gage	Diameter Dec. In.	Approx. Wt. Lbs. per 100 Ft.	Number Feet in 1 Lb.
1/4"	.2500	18.08	5.32	14	.0640	1.18	84.66
3/16"	.1875	10.17	9.81	16	.0508	.74	134.40
6	.1620	7.54	13.22	18	.0403	.47	213.71
8	.1285	4.75	21.02	20	.0319	.29	339.82

70/30 SPRING TEMPER YELLOW BRASS WIRE

COILS — 150-200 LBS., 16 INCHES I.D.

Diameter Dec. In.	Feet in Lb.	Approx. Wt. Lbs. per Lin. Ft.	Diameter Dec. In.	Feet in Lb.	Approx. Wt. Lbs. per Lin. Ft.
.180	10.41	.0961	.090	41.84	.0239

**GRADE "A" PHOSPHOR BRONZE
SPRING WIRE — Alloy 351**

Random Weight Coils

B&S Gage	Diameter Dec. In.	Feet in Lb.	Approx. Wt. Lbs. per Lin. Ft.	B&S Gage	Diameter Dec. In.	Feet in Lb.	Approx. Wt. Lbs. per Lin. Ft.
7	.1440	15.92	.06281	10	.1019	31.94	.03131
8	.1285	20.08	.04981	11	.090	40.32	.0248
9	.1144	25.34	.03947				

18% NICKEL SILVER STRIP & WIRE

STRIP — 50 Lb. Coils

Width Inches	Nearest Gage No.	Approx. Wt. Lbs. per Sq. Ft.
6	18	1.834
8	27	6.462

WIRE, SOFT — 50-90 Lb. Coils

Diam. Inch	Nearest Gage No.	Approximate Lbs. per Lin. Ft.	Ft. in Lb.
.114	9	.0409	24.45

SHEET LEAD

SHEET SIZES — 36 x 48 Inches and 48 x 120 Inches

Wt. Lbs. per Sq. Ft.	Approx. Thickness Inch	Actual Decimal Inch	Wt. Lbs. per Sq. Ft.	Approx. Thickness Inch	Actual Decimal Inch
2	1/32	.033	8	1/8	.133
3	3/64	.048	12	3/16	.200
4	1/16	.065	16	1/4	.265
6	3/32	.098			

MISCELLANEOUS METALS

Kind of Metal	Approx. Wt. Lbs. Unit	Kind of Metal	Approx. Wt. Lbs. Unit
Lead—Bar	1 1/2	Lead—Pig	50
Lead—Calking, Bars	5	Zinc—Bar, 2x2 1/2x11 in.	9

TEMPER NUMBERS

Temper is created by varying degrees of cold rolling or drawing. The amount of reduction is often expressed in Brown & Sharpe gage numbers.

SHEET & STRIP

Temper Designation	Approximate B&S numbers reduction in thickness following the last anneal
Soft	0
Light Cold-Rolled	1/2
Quarter Hard	1
Half Hard	2
Three-Quarter Hard	3
Hard	4
Extra Hard	6
Spring	8
Extra Spring	10

RODS & WIRE

Temper Designation	Approximate B&S numbers reduction in diameter
Soft	0
Eighth Hard	1/2
Quarter Hard	1
Half Hard	2
Three-Quarter Hard	3
Hard	4
Extra Hard	6
Spring	8

ROUND SEAMLESS BRASS TUBES
HARD DRAWN — OUTSIDE DIAMETERS
Alloy No. 218 — Commercial Tolerances

Stock Lengths 12 Feet

O.D. Inches	Stubs' Gage	Wall Thickness Dec. In.	I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1/8	25	.020	.085	.024	.288
3/16	18	.049	.089	.079	.948
3/16	21	.032	.123	.058	.696
3/16	24	.022	.143	.042	.504
1/4	16	.065	.120	.139	1.668
1/4	18	.049	.152	.114	1.368
1/4	20	.035	.100	.087	1.044
1/4	22	.028	.194	.072	.864
5/16	16	.065	.182	.186	2.232
5/16	20	.035	.242	.112	1.344
5/16	22	.028	.256	.092	1.104
5/16	24	.022	.268	.074	.888
3/8	16	.065	.245	.233	2.796
3/8	18	.049	.277	.185	2.220
3/8	19	.042	.291	.162	1.944
3/8	20	.035	.305	.138	1.656
3/8	21	.032	.311	.127	1.524
3/8	23	.025	.325	.101	1.212
7/16	16	.065	.307	.280	3.360
7/16	19	.042	.353	.192	2.304
7/16	21	.032	.373	.150	1.800
7/16	23	.025	.387	.119	1.428
1/2	16	.065	.370	.327	3.924
1/2	18	.049	.402	.256	3.072
1/2	19	.042	.416	.223	2.676
1/2	21	.032	.436	.173	2.076
1/2	23	.025	.450	.137	1.644
1/2	25	.020	.460	.111	1.332
.540†	12	.109	.322	.538	10.760
9/16	16	.065	.432	.374	4.488
9/16	23	.025	.512	.156	1.872
5/8	16	.065	.495	.421	5.052
5/8	18	.049	.527	.327	3.924
5/8	19	.042	.541	.283	3.396
5/8	21	.032	.561	.220	2.640
5/8	23	.025	.575	.174	2.088
5/8	25	.020	.585	.140	1.680
11/16	22	.028	.631	.214	2.570
3/4	16	.065	.620	.515	6.180
3/4	18	.049	.652	.398	4.78
3/4	19	.045	.666	.344	4.13
3/4	20	.035	.680	.290	3.48
3/4	21	.032	.686	.266	3.19
3/4	23	.025	.700	.210	2.52
3/4	25	.020	.710	.169	2.03
13/16	16	.065	.683	.562	6.74
7/8	16	.065	.745	.609	7.31
7/8	18	.049	.777	.468	5.62
7/8	21	.032	.811	.312	3.74
7/8	23	.025	.825	.246	2.95
15/16	23	.025	.887	.264	3.17
1	13	.095	.810	.995	11.94
1	16	.065	.870	.703	8.44
1	18	.049	.902	.539	6.47
1	20	.035	.930	.391	4.69
1	23	.025	.950	.282	3.38
1 1/16	22	.028	1.006	.332	3.98
1 1/8	16	.065	.995	.797	9.56

†Stock Lengths 20 Ft.

(Continued on page 23)

ROUND SEAMLESS BRASS TUBES (Cont.)**HARD DRAWN — OUTSIDE DIAMETERS****Alloy No. 218 — Commercial Tolerances**

Stock Lengths 12 Feet

O.D. Inches	Stubs' Gage	Wall Thickness Dec. In.	I.D. Decimal Inch	Approx. Wt. Lbs. per Lin. Ft.	12 Ft.
1 1/8	19	.042	1.041	.526	6.31
1 1/4	16	.065	1.120	.891	10.69
1 1/4	18	.049	1.152	.681	8.17
1 1/4	19	.042	1.166	.587	7.04
1 1/4	21	.032	1.186	.451	5.41
1 1/4	23	.025	1.200	.354	4.25
1 5/16	16	.065	1.182	.938	11.25
1 5/16	21	.032	1.248	.471	5.65
1 3/8	16	.065	1.245	.985	11.82
1 1/2	16	.065	1.370	1.080	12.96
1 1/2	18	.049	1.402	.823	9.88
1 1/2	21	.032	1.436	.544	6.53
1 5/8	16	.065	1.495	1.173	14.08
1 3/4	16	.065	1.620	1.270	15.24
1 3/4	21	.032	1.686	.636	7.63
1 3/4	23	.025	1.700	.499	5.99
2	16	.065	1.870	1.460	17.52
2	18	.049	1.902	1.110	13.32
2 1/4	16	.065	2.120	1.640	19.68
2 1/2	16	.065	2.370	1.830	21.96
2 1/2	18	.049	2.402	1.390	16.68
2 1/2	19	.042	2.416	1.19	14.28
2 3/4	16	.065	2.620	2.02	24.24
3	16	.065	2.870	2.21	26.52
3 1/2	16	.065	3.370	2.58	30.96
4	16	.065	3.870	2.96	35.52
4 1/2	16	.065	4.370	3.34	40.08
5	16	.065	4.870	3.71	44.52

ROUND SEAMLESS BRASS TUBES**HARD DRAWN — INSIDE DIAMETERS**

Stock Lengths 12 Feet

I.D. Inches	O.D. Inches	Approx. Wt. Lbs. per Lin. Ft.	I.D. Inches	O.D. Inches	Approx. Wt. Lbs. per Lin. Ft.
1/8 Inch—(.125 Decimal Inch) Wall Thickness			1/8 Inch—(.125 Decimal Inch) Wall Thickness		

Alloy No. 218

3/8	.625	.72	8.64	2 1/4	2.50	3.44	41.28
1/2	.750	.90	10.80	2 1/2	2.75	3.80	45.60
5/8	.875	1.09	13.08	2 3/4	3.00	4.16	49.92
3/4	1.000	1.27	15.24	3	3.25	4.52	54.24
7/8	1.125	1.45	17.40	3 1/4	3.50	4.88	58.56
1	1.250	1.63	19.56	3 1/2	3.75	5.24	62.88
1 1/8	1.375	1.81	21.72	3 3/4	4.00	5.61	67.32
1 1/4	1.500	1.99	23.88	4	4.25	5.97	71.64
1 1/2	1.750	2.35	28.20	4 1/4	4.50	6.33	75.96
1 3/4	2.000	2.71	32.52	4 1/2	4.75	6.69	80.28
1 7/8	2.125	2.89	34.68	4 3/4	5.00	7.05	84.60
2	2.25	3.07	36.84				

Alloy No. 69

5	5.25	7.41	88.92	7	7.25	10.31	123.72
5 3/4	6.00	8.50	102.00	8	8.25	11.75	94.00
6	6.25	8.86	70.88				

No. 9 Stubs' Gage—(.148 Decimal Inch) Wall Thickness

3	3.296	5.39	64.68	7	7.296	12.24	146.88
3 1/2	3.796	6.25	75.00	9	9.296	15.67	188.04
4 1/2	4.796	7.96	95.52	10	10.296	17.38	208.56

ROUND SEAMLESS BRASS TUBES**Alloy No. 218 — HARD DRAWN — STRESS ANNEALED**

Stock Lengths 12 Feet

OUTSIDE DIAMETERS

O.D. Inches	Wall Dec. In.	Approx. Wt. Lin. Ft.	Wt. Lbs. per 12 Ft.	I.D. Inches	Wall Dec. In.	Approx. Wt. Lin. Ft.	Wt. Lbs. per 12 Ft.
1/2.....	.035.....	.186.....	2.23	1 1/8.....	.065.....	.895.....	10.74
.....	.065.....	.324.....	3.89	.....	.100.....	.948.....	11.38

ROUND SEAMLESS BRASS TUBES**SOFT DRAWN — OUTSIDE DIAMETERS — Alloy No. 218**

O.D. Inches	Wall Thickness Stubs' Gage	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.	Wt. Lbs. per 12 Ft.
3/8.....	19.....	.042.....	.291.....	.162.....1.944

SQUARE SEAMLESS BRASS TUBES**HARD DRAWN — Alloy No. 218**

Stock Lengths 12 Feet

Size Inches	Wall Thickness Stubs' Gage	Decimal Inch	Approx. Wt. Lbs. per Lin. Ft.	Wt. Lbs. per 12 Ft.
3/8.....	20.....	.035.....	.175.....	2.10
1/2.....	20.....	.035.....	.239.....	2.87
5/8.....	20.....	.035.....	.304.....	3.65
3/4.....	20.....	.035.....	.368.....	4.42
7/8.....	20.....	.035.....	.432.....	5.18
1.....	20.....	.035.....	.497.....	5.96
1 1/4.....	18.....	.049.....	.865.....	10.38
1 1/2.....	18.....	.049.....	1.045.....	12.54
1 3/4.....	18.....	.049.....	1.226.....	14.71
2.....	18.....	.049.....	1.410.....	16.92

"85" RED BRASS SEAMLESS PIPE — Alloy No. 24**STANDARD PIPE SIZES — Stock Lengths 20 Feet**

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Wt. Lbs. per 20 Ft.
1/8.....	.0620.....	.281.....	.405.....	.253.....	5.06
1/4.....	.0825.....	.375.....	.540.....	.450.....	9.00
3/8.....	.0905.....	.494.....	.675.....	.630.....	12.60
1/2.....	.1075.....	.625.....	.840.....	.938.....	18.76
5/8.....	.1140.....	.822.....	1.050.....	1.270.....	25.40
1.....	.1265.....	1.062.....	1.315.....	1.790.....	35.80
1 1/4.....	.1460.....	1.368.....	1.660.....	2.630.....	52.60
1 1/2.....	.1500.....	1.600.....	1.900.....	3.130.....	62.60
2.....	.1565.....	2.062.....	2.375.....	4.140.....	82.80
2 1/2.....	.1875.....	2.500.....	2.875.....	6.000.....	120.00
3.....	.2190.....	3.062.....	3.500.....	8.560.....	171.20
4.....	.2500.....	4.000.....	4.500.....	12.660.....	253.20
5.....	.2500.....	5.062.....	5.563.....	15.850.....	317.00
6.....	.2500.....	6.125.....	6.625.....	18.990.....	379.80
7/8.....	.3120.....	8.001.....	8.625.....	30.900.....	370.80

EXTRA HEAVY PIPE SIZES — Stock Lengths 20 Feet

1/8.....	.100.....	.205.....	.405.....	.363.....	7.26
1/4.....	.123.....	.294.....	.540.....	.611.....	12.22
3/8.....	.127.....	.421.....	.675.....	.829.....	16.58
1/2.....	.149.....	.542.....	.840.....	1.230.....	24.60
5/8.....	.157.....	.736.....	1.050.....	1.670.....	33.40
1.....	.182.....	.951.....	1.315.....	2.460.....	49.20
1 1/4.....	.194.....	1.272.....	1.660.....	3.390.....	67.80
1 1/2.....	.203.....	1.494.....	1.900.....	4.100.....	82.00
2.....	.221.....	1.933.....	2.375.....	5.670.....	113.40
3.....	.304.....	2.392.....	3.500.....	11.600.....	232.00
5.....	.375.....	4.812.....	5.562.....	23.200.....	464.00
6.....	.437.....	5.751.....	6.625.....	32.200.....	644.00

†12 Foot Lengths

ALUMINUM COILS, SHEETS, PLATES**SPECIFICATIONS & INDEX**

Aluminum
Coils,
Sheets,
Plates

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ALCOA ALUMINUM COILED SHEET***Unidentified, Not Interleaved***

We can slit coils to width, cut to length and roller level according to customer requirements.

ONE SIDE BRIGHT MILL FINISH***Coils Approx. 150 Pounds — I.D. 10 Inches***

Thickness	B&S	Width	Approx.	Thickness	B&S	Width	Approx.
Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.	Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.

Alloy 1100-0 — Spec. QQ-A-561c Cond. A

.010....30....12....	.141....	.141....	.025....22....24....	.357....	.714....
.012....28....12....	.178....	.178....	.032....20....12....	.452....	.452....
18....	.178....	.267....	18....	.452....	.678....
.016....26....12....	.224....	.224....	24....	.452....	.904....
18....	.224....	.336....	.040....18....12....	.569....	.569....
.020....24....12....	.284....	.284....	24....	.569....	1.138....
24....	.284....	.568....	.050....16....18....	.706....	1.059....
.025....22....12....	.357....	.357....	24....	.706....	1.412....
18....	.357....	.535....	.063....14....24....	.889....	1.778....

MILL FINISH***Approx. 2000 to 4000 Lb. Coils — I.D. 20 Inches, O.D. 51 Inches***

Thickness	B&S	Width	Approx.	Thickness	B&S	Width	Approx.
Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.	Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.

Alloy 1100-0 — Spec. QQ-A-561c

.032....20....36....	.452....	1.356....	.050....16....48....	.706....	2.824....
.040....18....36....	.569....	1.707....	.063....14....36....	.889....	2.667....
48....	.569....	2.276....	48....	.889....	3.556....

Alloy 1100-H14 — Spec. QQ-A-561c

.020....24....36....	.284....	.852....	.050....16....36....	.706....	2.118....
.032....20....36....	.452....	1.356....	48....	.706....	2.824....
48....	.452....	1.808....	.063....14....36....	.889....	2.667....

Alloy 3003-0 — Spec. QQ-A-359d

.016....26....18....	.228....	.342....	.050....16....36....	.713....	2.139....
.020....24....36....	.287....	.861....	48....	.713....	2.852....
.032....20....36....	.456....	1.368....	.063....14....36....	.898....	2.694....
48....	.456....	1.824....	48....	.898....	3.592....
.040....18....36....	.575....	1.725....	.090....11....36....	1.280....	3.840....
48....	.575....	2.300....	48....	1.280....	5.120....

Alloy 3003-H14 — Spec. QQ-A-359d

.016....26....24....	.228....	.456....	.050....16....48....	.713....	2.852....
.020....24....36....	.287....	.861....	.063....14....36....	.898....	2.694....
.025....22....36....	.361....	1.083....	48....	.898....	3.592....
.032....20....36....	.456....	1.368....	.080....12....36....	1.150....	3.450....
48....	.456....	1.824....	48....	1.150....	4.600....
.040....18....36....	.575....	1.725....	.090....11....36....	1.280....	3.840....
48....	.575....	2.300....	48....	1.280....	5.120....
.050....16....24....	.713....	1.426....	.100....10....48....	1.420....	5.680....
36....	.713....	2.139....			

ALCOA ALUMINUM COILED SHEET (Cont.)

Unidentified, Not Interleaved

Coils slit to width, cut to length and roller levelled, available on request.

MILL FINISH

Approx. 2000 to 4000 Lb. Coils — I.D. 20 Inches, O.D. 51 Inches

Thickness	B&S	Width	Approx.	Thickness	B&S	Width	Approx.
Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.	Dec. In.	Gage	Inches	Wt. Lbs. per Sq. Ft.

Alloy 3105-H25

.019....24....36....	.287....	.861	.040....18....36....	.575....	1.725
48....	.287....	1.148	48....	.575....	2.300
.024....22....36....	.361....	1.083	.050....16....36....	.706....	2.118
48....	.361....	1.444	48....	.706....	2.824
.032....20....36....	.456....	1.368	.063....14....36....	.889....	2.667
48....	.456....	1.824	48....	.889....	3.556

Alloy 5005-H34

.032....20....36....	.456....	1.368	.050....16....48....	.713....	2.852
48....	.456....	1.824	.063....14....36....	.898....	2.694
.040....18....36....	.575....	1.725	48....	.898....	3.592
48....	.575....	2.300	.080....12....48....	1.15....	4.608
.050....16....36....	.713....	2.139	.090....11....48....	1.260....	5.040

Alloy 5052-O — Spec. QQ-A-318c

.025....22....36....	.353....	1.059	.050....16....48....	.699....	2.796
.032....20....48....	.447....	1.788	.063....14....48....	.880....	3.520
.040....18....48....	.563....	2.252	.080....12....48....	1.130....	4.520
.050....16....36....	.699....	2.097	.090....11....48....	1.260....	5.040

Alloy 5052-H32 — Spec. QQ-A-318c

.032....20....36....	.447....	1.341	.063....14....36....	.880....	2.640
48....	.447....	1.788	48....	.880....	3.520
.040....18....36....	.563....	1.689	.080....12....36....	1.130....	3.390
48....	.563....	2.252	48....	1.130....	4.520
.050....16....36....	.699....	2.097	.090....11....48....	1.260....	5.040
48....	.699....	2.796			

Alloy 5052-H34 — Spec. QQ-A-318c

.020....24....36....	.280....	.840	.040....18....48....	.563....	2.252
.025....22....36....	.353....	1.059	.050....16....36....	.699....	2.097
.032....20....36....	.447....	1.341	48....	.699....	2.796
48....	.447....	1.788	.063....14....36....	.880....	2.640
.040....18....36....	.563....	1.689	48....	.880....	3.520

Alloy 6061-O — Spec. QQ-A-327b

.016....26....36....	.224....	.672	.050....16....48....	.706....	2.824
.020....24....36....	.284....	.852	.063....14....48....	.889....	3.556
.025....22....36....	.357....	1.071	.071....13....48....	1.000....	4.000
.032....20....48....	.452....	1.808	.080....12....48....	1.140....	4.560
.040....18....48....	.569....	2.276	.090....11....48....	1.270....	5.080

Alloy 6061-T6 — Spec. QQ-A-327b

.040....18....48....	.569....	2.276
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ALCLAD BUILDING SHEET — H16 TEMPER (3/4 HARD)

.040....18....48....	.575....	2.300
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ALCOA ALUMINUM FLAT SHEETS**Alloy 1100-0 — Spec. QQ-A-561c Cond. A****MILL FINISH — Not Interleaved**

Thickness	B&S Gage	Sheet Size	Approx. Wt.	Thickness	B&S Gage	Sheet Size	Approx. Wt.
Dec. In. or In.	Inches	Sq. Ft.	Lbs. per Sheet	Dec. In. or In.	Inches	Sq. Ft.	Lbs. per Sheet
.016	.26	24x72	.224... 2.69	.050	.16	36x96	.706... 16.94
.020	.24	24x72	.284... 3.41			48x144	.706... 33.89
.025	.22	24x72	.357... 4.28	.063	.14	36x96	.889... 21.34
.032	.20	24x72	.452... 5.42			48x144	.889... 42.67
		36x96	.452... 10.85	.080	.12	36x96	.114... 27.36
.040	.18	24x72	.569... 6.83	.090	.11	36x96	.127... 30.48
		36x96	.569... 13.66	.100	.10	36x96	.141... 33.88
		48x144	.569... 27.31	.125	.18	36x96	.176... 42.24
.050	.16	24x72	.706... 8.47			48x144	.176... 84.44

Alloy 1100-H14 — Spec. QQ-A-561c — Cond. 1/2 Hard**MILL FINISH — Not Interleaved**

.016	.26	24x72	.224... 2.69	.050	.16	48x144	.706... 33.87
.020	.24	24x72	.284... 3.40	.063	.14	24x72	.889... 10.69
		36x96	.284... 6.81			36x96	.889... 21.34
		36x120	.284... 8.52			36x120	.889... 26.67
.025	.22	24x72	.357... 4.28			48x144	.889... 42.67
.032	.20	36x120	.452... 13.56	.080	.12	36x96	.1140... 27.37
		48x144	.452... 21.70	.090	.11	36x96	.1270... 30.48
.040	.18	24x72	.569... 6.82			48x144	.1270... 60.96
		36x96	.569... 13.66	.100	.10	36x96	.1410... 33.84
		36x120	.569... 17.07			48x144	.1410... 67.68
		48x144	.569... 27.31	.125	.18	36x96	.1760... 42.24
.050	.16	24x72	.706... 8.47			48x144	.1760... 84.48
		36x96	.706... 16.93	.190	.36	48x144	.2681... 128.70
		36x120	.706... 21.18				

Alloy 1100-H25 — Spec. QQ-A-561c — Cond. 1/2 Hard**ONE SIDE BRIGHT MILL FINISH — Interleaved, Not Identified**

.012	.28	16x36	.178... .71	.032	.20	24x72	.452... 5.40
.016	.26	36x96	.224... 5.38			36x96	.452... 10.85
.020	.24	24x72	.284... 3.40	.040	.18	36x96	.569... 13.66
		36x96	.284... 6.81	.050	.16	24x72	.706... 8.47
.025	.22	24x72	.357... 4.28			36x96	.706... 16.94
		36x96	.357... 8.57	.063	.14	36x96	.889... 21.34

Alloy 2014-T6 ALCLAD — Spec. QQ-A-255a-1**MILL FINISH — Interleaved, Not Identified**

Thickness	B&S Gage	Sheet Size	Approx. Wt. Lbs. per Sheet
Dec. In.	Inches	Sq. Ft.	
.040	18	48x144	.584... 28.03

§Interleaved

LITERATURE ON ALCOA ALUMINUM

Here are a few of the booklets published by Alcoa that are available to you free by contacting the Ducommun office nearest you.

Aluminum and its Alloys
 Aluminum Finishing
 Aluminum Structural Handbook
 Automatic Screw Machines
 Machining Alcoa Aluminum
 Roofing and Siding — Industrial
 Standard Architectural Specifications
 Window Sills and Thresholds

Aluminum Castings
 Aluminum Welding
 Building Sheet
 Extruded Shapes
 Farm Roofing Sheet
 Fasteners
 Pipe and Fittings
 Truck Bodies

ALCOA ALUMINUM FLAT SHEETS

Alloy 2024-O BARE — Spec. QQ-A-355c Cond. A

Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
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MILL FINISH — Interleaved and "AN" Identified

.025...22...	48x144...	.364...17.47	.080...12...	48x144...	1.16 ...55.22
.032...20...	48x144...	.461...22.13	.090...11...	48x144...	1.30 ...62.40
.040...18...	48x144...	.580...27.84	.100...10...	48x144...	1.44 ...69.12
.050...16...	48x144...	.720...34.56	.125...1/8...	48x144...	1.80 ...86.40
.063...14...	48x144...	.907...43.54	.160...5/32...	48x144...	2.31 ...110.88
.071...13...	48x144...	1.02 ...48.96	.190...3/16...	48x144...	2.73 ...131.04

SKIN QUALITY — Interleaved and "AN" Identified

.071...13...	60x144...	1.02 ...61.20
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Alloy 2024-O ALCLAD — Spec. QQ-A-362b Cond. A

MILL FINISH — Interleaved and "AN" Identified

.012...28...	36x120...	.181...5.43	.063...14...	48x144...	.907...43.54
.016...26...	36x144...	.229...8.24	.071...13...	48x144...	1.02 ...48.96
.020...24...	36x144...	.289...10.40	.080...12...	48x144...	1.16 ...55.68
.025...22...	48x144...	.364...17.47		48x186...	1.16 ...71.92
.032...20...	48x144...	.461...22.13		60x180...	1.16 ...87.00
	60x180...	.461...34.58		68x170...	1.16 ...93.12
.036...19...	48x144...	.515...24.72	.090...11...	48x144...	1.30 ...62.40
.040...18...	48x144...	.580...27.84	.100...10...	48x144...	1.44 ...69.12
.045...17...	48x144...	.650...31.20	.125...1/8...	48x144...	1.80 ...86.40
.050...16...	60x180...	.720...54.00	.160...5/32...	48x144...	2.31 ...110.88
	48x144...	.720...34.56	.190...3/16...	48x144...	2.73 ...131.04
.056...15...	48x144...	.819...39.31			

SKIN QUALITY — Interleaved and "AN" Identified

.010...30...	30x144...	.144...4.32
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Alloy 2024-T3 BARE — Spec. QQ-A-355c Cond. T

MILL FINISH — Interleaved and "AN" Identified

.016...26...	36x144...	.229...8.24	.080...12...	48x96 ...	1.16 ...37.12
.020...24...	36x144...	.289...10.40		48x144...	1.16 ...55.68
.025...22...	48x144...	.364...17.47	.090...11...	48x144...	1.30 ...62.40
.032...20...	48x144...	.461...22.13	.100...10...	48x144...	1.44 ...69.12
.040...18...	48x144...	.580...27.84	.125...10...	48x144...	1.80 ...86.40
	60x180...	.580...43.50	.160...5/32...	48x144...	2.31 ...110.88
.050...16...	48x144...	.720...34.56	.188...3/16...	36x96 ...	2.70 ...70.20
.063...14...	48x144...	.907...43.54	.190...3/16...	48x144...	2.73 ...131.04
.071...13...	48x144...	1.02 ...48.96			

Alloy 2024-T3 ALCLAD — Spec. QQ-A-362b Cond. T

MILL FINISH — Interleaved and "AN" Identified

.012...28...	36x120...	.181...5.43	.045...17...	48x144...	.650...31.20
.016...26...	36x144...	.229...8.24	.050...16...	48x144...	.720...34.56
	48x144...	.229...10.99	.063...14...	48x144...	.907...43.54
.020...24...	36x144...	.289...10.40		60x180...	.907...68.03
	48x144...	.289...13.87	.071...13...	48x144...	1.02 ...48.96
.025...22...	36x144...	.364...13.10	.080...12...	48x144...	1.16 ...55.68
	48x144...	.364...17.47	.090...11...	48x144...	1.30 ...62.40
.032...20...	48x144...	.461...22.13	.100...10...	48x144...	1.44 ...69.12
	60x180...	.461...34.58	.125...1/8...	48x144...	1.80 ...86.40
.040...18...	48x144...	.580...27.84	.160...5/32...	48x144...	2.31 ...110.88
	60x180...	.580...43.50	.190...3/16...	48x144...	2.73 ...131.04

SKIN QUALITY — Interleaved and "AN" Identified

.010...30...	24x144...	.144...3.46	.016...26...	48x144...	.229...10.99
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ALCOA ALUMINUM FLAT SHEETS**Alloy 3003-0 — Spec. QQ-A-359d Cond. A****MILL FINISH — Not Interleaved**

Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet Size Inches	Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
.025...	22...36x96 ...	.361... 8.65		.063...	14...36x96 ...	.898... 21.55
.032...	20...36x96 ...	.456... 10.94			48x144... .456...	.898... 43.11
	48x144...	.456... 21.89		.080...	12...36x96 ...	1.15... 27.60
.040...	18...36x96 ...	.575... 13.80			48x144... .575...	1.15... 54.19
	48x144...	.575... 27.60		.090...	11...48x144 ...	1.28... 61.44
.050...	16...36x96 ...	.713... 17.11		.125\$... 1/8...	36x96 ... .713...	1.78... 42.72
	48x144...	.713... 34.21			48x144... .713...	1.78... 85.50

Alloy 3003-H14 — Spec. QQ-A-359d Cond. 1/2 Hard**MILL FINISH — Unidentified, Not Interleaved**

Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet Size Inches	Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
.016...	26...24x72 ...	.227... 2.73		.050...	16...60x144 ...	.713... 42.78
.020...	24...24x72 ...	.287... 3.44		.063...	14...36x96 ...	.898... 21.55
	36x96 ...	.287... 6.88			36x120... .287...	.898... 26.94
	36x120...	.287... 8.61			48x96 ... .287...	.898... 28.74
.025...	22...36x96 ...	.361... 8.67			48x120... .287...	.898... 35.92
	36x120...	.361... 10.83			48x144... .361...	.898... 43.10
	48x144...	.361... 17.33			60x144... .361...	.898... 53.88
.032...	20...36x96 ...	.456... 10.94		.080...	12...36x96 ...	1.15... 27.60
	36x120...	.456... 13.68			48x144... .456...	1.15... 55.20
	48x120...	.456... 18.24		.090...	11...36x96 ...	1.28... 30.72
	48x144...	.456... 21.89			48x144... .456...	1.28... 61.44
.040...	18...36x96 ...	.575... 13.80			60x144... .456...	1.28... 76.80
	36x120...	.575... 17.25		.100...	10...36x96 ...	1.42... 34.08
	36x144...	.575... 20.70			48x144... .575...	1.42... 68.16
	48x96 ...	.575... 18.40		.125\$... 1/8...	36x96 ... .713...	1.78... 42.72
	48x120...	.575... 23.00			36x120... .575...	1.78... 53.40
	48x144...	.575... 27.60			48x120... .575...	1.78... 71.20
	60x144...	.575... 34.50			48x144... .575...	1.78... 85.44
.050...	16...36x96 ...	.713... 17.11			60x144... .575...	1.78... 106.80
	36x120...	.713... 21.39		.190\$... 3/16...	36x96 ... .713...	2.71... 65.04
	48x120...	.713... 28.52			48x144... .713...	2.71... 130.08
	48x144...	.713... 34.22				

Alloy 3105-H25**MILL FINISH — Unidentified, Not Interleaved**

Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet Size Inches	Thick- ness Dec. In. or In.	B&S Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
.019...	24...36x96 ...	.286... 6.86		.040...	18...36x96 ...	.575... 13.80
	36x120...	.286... 8.58			36x120... .575...	17.25
	36x144...	.286... 10.30			36x144... .575...	20.70
	48x96 ...	.286... 9.15			48x96 ... .575...	18.40
	48x120...	.286... 11.44			48x120... .575...	23.00
	48x144...	.286... 13.73			48x144... .575...	27.60
.024...	22...36x96 ...	.360... 8.64		.050...	16...36x96 ...	.706... 16.94
	36x120...	.360... 10.80			36x120... .706...	21.18
	36x144...	.360... 12.96			36x144... .706...	25.42
	48x96 ...	.360... 11.52			48x96 ... .706...	22.59
	48x120...	.360... 14.40			48x120... .706...	28.24
	48x144...	.360... 17.28			48x144... .706...	33.89
.032...	20...36x96 ...	.456... 10.94		.063...	14...36x96 ...	.898... 21.55
	36x120...	.456... 13.68			36x120... .898...	26.94
	36x144...	.456... 16.42			36x144... .898...	32.33
	48x96 ...	.456... 14.59			48x96 ... .898...	28.74
	48x120...	.456... 18.24			48x120... .898...	35.92
	48x144...	.456... 21.89			48x144... .898...	43.10

§Interleaved

ALCOA ALUMINUM FLAT SHEETS**Alloy 5005-H34****MILL FINISH — Not Interleaved, Oiled or Identified**

Thick- ness Dec. In. or in.	B&S Sheet Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet	Thick- ness Dec. In. or in.	B&S Sheet Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet
.032...	20...	36x96 ...	.456... 10.94	.063...	14...	48x96 ...	.898... 28.74
		36x120...	.456... 13.68			48x120...	.898... 35.92
		48x120...	.456... 18.24			48x144...	.898... 43.10
.040...	18...	36x96 ...	.575... 13.80	.080...	12...	36x96 ...	1.15 ... 27.60
		36x120...	.575... 17.25			48x96 ...	1.15 ... 36.80
		48x96 ...	.575... 18.40			48x144...	1.15 ... 55.20
		48x120...	.575... 23.00	.090...	11...	48x144...	1.28 ... 61.44
		48x144...	.575... 27.60	.100...	10...	48x144...	1.42 ... 68.16
.050...	16...	36x96 ...	.713... 17.11	.125\$... 1/8...	36x96 ...	.713... 17.11	.125\$... 1/8...
		48x120...	.713... 28.52			48x96 ...	.78 ... 56.96
		48x144...	.713... 34.22			48x120...	.78 ... 71.20
.063...	14...	36x96 ...	.898... 21.55			48x144...	.78 ... 85.44
		36x120...	.898... 26.94	.190\$... 3/16...	48x120...	.271 ... 108.40	

Alloy 5052-0 — Spec. QQ-A-318c Cond. A**MILL FINISH — Not Interleaved**

.020...	24...	36x96 ...	.280... 6.72	.063...	14...	36x96 ...	.880... 21.12
.025...	22...	36x96 ...	.353... 8.47			48x144...	.880... 42.24
.032...	20...	36x96 ...	.447... 10.73	.080...	12...	48x144...	1.13 ... 53.64
		48x144...	.447... 21.46	.090...	11...	48x144...	1.26 ... 60.34
.040...	18...	48x144...	.563... 27.02	.125\$... 1/8...	48x144...	1.75 ... 84.00	
.050...	16...	36x96 ...	.699... 16.76	.190\$... 3/16...	48x144...	2.65 ... 127.39	

Alloy 5052-H32 — Spec. QQ-A-318c Cond. 1/4 Hard**MILL FINISH — Not Interleaved**

.020...	24...	36x96 ...	.280... 6.72	.080...	12...	36x96 ...	1.13 ... 26.82
		36x144...	.280... 10.00			48x96 ...	1.13 ... 35.76
.025...	22...	36x96 ...	.353... 8.47			48x144...	1.13 ... 53.64
		36x144...	.353... 12.71	.090...	11...	36x96 ...	1.26 ... 30.17
.032...	20...	36x96 ...	.447... 10.73			48x96 ...	1.26 ... 40.23
		48x96 ...	.447... 14.30			48x144...	1.26 ... 60.34
		48x144...	.447... 21.46	.100...	10...	48x96 ...	1.40 ... 44.80
.040...	18...	36x96 ...	.563... 13.51			48x144...	1.40 ... 67.20
		48x96 ...	.563... 18.02	.125\$... 1/8...	36x96 ...	1.75 ... 42.00	
		48x144...	.563... 27.02			48x96 ...	1.75 ... 56.01
.050...	16...	36x96 ...	.699... 16.76			48x144...	1.75 ... 84.00
		48x96 ...	.699... 22.35	.188...	72x240...	2.63 ... 315.60	
		48x144...	.699... 33.52			84x240...	2.63 ... 368.20
.063...	14...	36x96 ...	.880... 21.12	.190\$... 3/16...	36x96 ...	2.65 ... 63.69	
		48x96 ...	.880... 28.16			48x144...	2.65 ... 127.39
		48x144...	.880... 42.24				

Alloy 5052-H34 — Spec. QQ-A-318c Cond. 1/2 Hard**MILL FINISH — Unoiled, Unidentified, Not Interleaved**

.020...	24...	36x96 ...	.280... 6.72	.050...	16...	48x120...	.699... 27.96
.025...	22...	36x96 ...	.353... 8.47			48x144...	.699... 33.52
.032...	20...	36x96 ...	.447... 10.73			48x168...	.699... 39.14
		48x96 ...	.447... 14.31	.063...	14...	36x96 ...	.880... 21.12
		48x120...	.447... 17.89			48x120...	.880... 35.20
		48x144...	.447... 21.46			48x144...	.880... 42.24
.040...	18...	36x96 ...	.563... 13.51			60x144...	.880... 52.80
		48x96 ...	.563... 18.02	.080...	12...	48x144...	1.13 ... 53.64
		48x120...	.563... 22.52	.090...	11...	48x144...	1.26 ... 60.34
		48x144...	.563... 27.02			60x144...	1.26 ... 75.60
		48x168...	.563... 31.53	.100...	10...	48x144...	1.40 ... 67.20
.050...	16...	36x96 ...	.699... 16.76	.125\$... 1/8...	48x144...	1.75 ... 84.00	
		36x144...	.699... 24.84			60x144...	1.75 ... 105.00
		48x96 ...	.699... 22.35	.190\$... 3/16...	48x144...	2.65 ... 127.39	

§Interleaved

ALCOA ALUMINUM FLAT SHEETS**Alloy 5086-0 — Spec. MIL-A-19070A****MILL FINISH — Interleaved and Identified**

Thickness Dec. In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.071.....13.....		48x144.....	1.00.....	48.00

Alloy 5086-H32 — Spec. MIL-A-19070A**MILL FINISH — Unoiled, Unidentified, Not Interleaved**

Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet	Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.025...22...36x96...		.353...8.47			.125†...1/8...36x96...		.175...42.00		
.040...18...36x96...		.563...13.51					48x144...	.175...84.00	
.063...14...36x96...		.880...21.12			.190†...3/16...48x144...		.265...127.20		
		48x144...	.880...42.24				60x240...	.265...265.00	
.080...12...48x144...		1.13...53.64					96x240...	.265...424.00	
.090...11...48x144...		1.26...60.34							

Alloy 5454-H32 — Spec. MIL-A-21598**MILL FINISH — Interleaved and Unidentified**

.151.....84x261...	2.11	.321.25			.173.....84x261...	2.42	.368.45
.160.....60x144...	2.24	.134.40			.188.....84x261...	2.62	.398.90

Alloy 6061-0 — Spec. QQ-A-327b Cond. A**MILL FINISH — Identified and Interleaved**

Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet	Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.016...26...36x144...		.224...8.06			.071...13...48x144...		.101...48.48		
.020...24...36x144...		.284...10.22			.080...12...48x144...		.114...54.19		
.025...22...36x144...		.357...12.85			.090...11...36x144...		.127...45.72		
.032...20...48x144...		.452...21.70					.48x144...	.127...60.96	
.040...18...48x144...		.569...27.31			.100...10...48x144...		.143...68.64		
.050...16...48x144...		.706...33.89			.125...1/8...48x144...		.176...84.48		
.063...14...48x144...		.889...42.69			.190...3/16...48x144...		.268...128.70		

Alloy 6061-T4 — Spec. QQ-A-327b Cond. W**MILL FINISH — Interleaved and Identified**

.020...24...36x144...		.284...10.22			.071...13...48x144...		.100...48.00		
.025...22...36x144...		.357...12.85			.080...12...48x144...		.114...54.72		
.032...20...48x144...		.452...21.70			.090...11...48x144...		.127...60.96		
.040...18...48x144...		.569...27.31			.100...10...48x144...		.141...67.68		
.050...16...48x144...		.706...33.89			.125...1/8...48x144...		.176...84.48		
.063...14...48x144...		.889...42.67			.190...3/16...48x144...		.268...128.70		

Alloy 6061-T6 BARE — Spec. QQ-A-327b Cond. T**MILL FINISH — Interleaved and Identified**

Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet	Thickness Dec. In. or In.	B&S Gage	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Sheet
.016...26...36x144...		.224...8.06			.071...13...48x144...		.100...48.00		
.020...24...36x144...		.284...10.22			.080...12...48x144...		.114...54.72		
.025...22...36x144...		.357...12.85					.60x144...	.114...68.40	
.032...20...36x96...		.452...10.85			.090...11...48x144...		.127...60.96		
		48x144...	.452...21.70				.60x144...	.127...76.20	
.040...18...30x144...		.569...17.09			.100...10...48x144...		.141...64.68		
		36x96...	.569...13.66				.60x144...	.141...84.66	
		48x144...	.569...27.31		.125...1/8...36x144...		.176...63.66		
.050...16...36x96...		.706...16.94					.48x120...	.176...70.40	
		48x96...	.706...22.59				.48x144...	.176...84.48	
		48x120...	.706...28.24				.60x144...	.176...105.60	
		48x144...	.706...33.89		.160...5/8...48x144...		.226...108.48		
		60x144...	.706...42.36				.60x144...	.226...135.60	
.063...14...36x96...		.889...21.34			.190...3/16...48x144...		.268...128.64		
		48x144...	.889...42.67				.60x144...	.268...160.80	
		60x144...	.889...53.34				72x144...	.268...192.96	
		60x216...	.889...80.01						

Alloy 6061-T6 ALCLAD**MILL FINISH — Interleaved and Unidentified**

.040...18...48x96...		.569...18.21			.040...18...48x144...		.569...27.31		
		48x120...	.569...22.76						

†Interleaved and Identified

ALCOA ALUMINUM FLAT SHEETS**Alloy 7075-0 BARE — Spec. QQ-A-283a Cond. A****MILL FINISH** — Interleaved and "AN" Identified

Thick- ness Dec. In. or In.	B&S Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet	Thick- ness Dec. In. or In.	B&S Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet
.040	18	48x144	.586...28.13	.090	11	48x144	1.31...62.88
.050	16	48x144	.727...34.90	.100	10	48x144	1.45...69.60
.063	14	48x144	.916...43.97	.125	1/8	48x144	1.82...87.36
.071	13	48x144	1.040...49.92	.160	5/32	48x144	2.33...111.84
.080	12	48x144	1.180...56.64	.190	3/16	48x144	2.76...132.48

Alloy 7075-0 ALCLAD — Spec. QQ-A-287a-1 Cond. A**MILL FINISH** — Interleaved and "AN" Identified

.016	26	36x144	.231...8.32	.063	14	60x180	.916...68.70
.020	24	48x144	.292...14.02	.071	13	48x144	1.04...49.57
.025	22	36x144	.368...13.25	.080	12	48x144	1.18...55.77
		48x144	.368...17.66	.090	11	48x144	1.31...62.83
.032	20	48x144	.465...22.32	.100	10	48x144	1.45...69.81
.040	18	48x144	.586...28.12			60x180	1.45...108.75
		60x180	.586...43.95	.125	1/8	48x144	1.82...87.36
.050	16	48x144	.727...34.90	.160	5/32	48x144	2.33...111.69
.063	14	48x144	.916...43.99	.190	3/16	48x144	2.76...132.48

SKIN QUALITY — Interleaved and "AN" Identified

.090	11	48x144	1.31...62.83
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Alloy 7075-T6 BARE — Spec. QQ-A-283a Cond. T**MILL FINISH** — Interleaved and "AN" Identified

.032	20	48x144	.465...22.32	.090	11	48x144	1.31...62.88
.040	18	48x144	.586...28.13	.100	10	48x144	1.45...69.60
.050	16	48x144	.727...34.90	.125	1/8	48x144	1.82...87.36
.063	14	48x144	.916...43.97	.140	5/4	48x144	2.08...99.84
.071	13	48x144	1.040...49.92	.160	5/32	48x144	2.33...111.84
.080	12	48x144	1.180...56.64	.190	3/16	48x144	2.76...132.48

SKIN QUALITY — Interleaved and "AN" Identified

.080	12	48x144	1.180...56.64
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Alloy 7075-T6 ALCLAD — Spec. QQ-A-287a-1 Cond. T**MILL FINISH** — Interleaved and "AN" Identified

.010	30	36x144	.145...5.22	.063	14	48x144	.916...43.97
.012	28	36x144	.184...6.62	.071	13	48x144	1.04...49.92
.016	26	36x144	.231...8.32			60x180	1.04...78.00
.020	24	36x144	.292...10.51	.080	12	48x144	1.18...56.64
		48x144	.292...14.02	.090	11	48x144	1.31...62.88
.025	22	48x144	.368...17.66			60x180	1.31...98.25
.032	20	48x144	.465...22.32	.100	10	48x144	1.45...69.60
.040	18	48x144	.586...28.13	.125	1/8	48x144	1.82...87.36
		48x160	.586...31.25	.160	5/32	48x144	2.33...111.84
		60x180	.586...43.95	.190	3/16	48x144	2.76...132.48
.050	16	48x144	.727...34.90				

SKIN QUALITY — Interleaved and "AN" Identified

.020	24	48x144	.292...14.02	.071	13	48x144	1.04...49.92
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Alloy 7178-0 BARE — Spec. MIL-A-9180A**MILL FINISH** — Oiled and Identified

.032	20	48x144	.465...22.32	.080	12	48x144	1.18...56.64
.040	18	48x144	.586...28.13	.125	1/8	48x144	1.82...87.36
.063	14	48x144	.916...43.97	.190	3/16	48x144	2.76...132.48

Alloy 7178-T6 BARE — Spec. MIL-A-9180A**MILL FINISH** — Oiled and Identified

.032	20	48x144	.47...22.56	.090	11	48x144	1.31...62.88
.063	14	48x144	.92...44.16	.112	9	48x144	1.66...79.68
.071	13	48x144	1.04...49.57	.160	5/32	48x144	2.33...111.69
.080	12	48x144	1.18...55.77	.190	3/16	48x144	2.76...132.48

ALCOA ALUMINUM FLAT SHEETS**Alloy 7178-T6 ALCLAD — Spec. MIL-A-9183B****MILL FINISH — Oiled and Identified**

Thickness Dec. In. or In.	B&S Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet	Thickness Dec. In. or In.	B&S Gage Inches	Sheet Size Sq. Ft.	Approx. Wt. Lbs. per Sheet
.036	19	48x144	.52 .25.06	.100	10	48x144	1.45 .69.81
.045	17	48x144	.66 .31.63				

Alloy 32-H26 ALUMILITE SHEETS**MILL FINISH — Interleaved**

.020...24...†36x96 ...	.284...6.82	.050...16...48x144...	.717...34.42
.032...20...†36x96 ...	.452...10.85	.063...14...48x144...	.905...43.44
48x96 ...	.452...14.46	.125...1/8...†48x96 ...	1.78 ...56.96
48x144... .452...21.70		†48x144... 1.78	...85.44

†Temper H14

†Temper H24

LIGHTING SHEETS — H18 TEMPER**SPECULAR FINISH ONE SIDE ONLY — Interleaved**

.025...22...24x72375...4.50	.032...20...24x72452...5.42
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PATTERN SHEETS

STUCCO PATTERN



FLUTED PATTERN



DIAMOND PATTERN



SQUARE PATTERN

Thickness Dec. In.	B&S Gage	Pattern No.	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	
Alloy 3003-H114 — MILL FINISH — Interleaved					
.025	22	Stucco—E-5	36x96	.361	8.66
.032	20	Stucco—E-5	48x144	.456	21.89
.040\$	18	Stucco—E-5	48x144	.575	27.60
.040	18	Fluted—10	48x144	.575	27.60
.040	18	Square—E-14	48x144	.575	27.60
.050	16	Fluted—10	48x144	.713	34.22
.050	16	Diamond—E-13	48x144	.713	34.22

Alloy 3105-H25 — MILL FINISH — Interleaved

.032.....20.....Diamond—E-13.....48x96.....	.456.....14.59
.032.....20.....Diamond—E-13.....48x108.....	.456.....16.42
.032.....20.....Diamond—E-13.....48x120.....	.456.....18.24

§Also stocked in coils

ANOCLED FLUTED PATTERN SHEETS**MILL FINISH — Interleaved**

Thickness Dec. In.	Type No.	Sheet Size Inches	Temper No.	Approx. Wt. Lbs. per Sq. Ft.
.063.....10.....48x144.....H-154.....	.898.....43.11			

BRAZING SHEETS — Alloy 22F

.040.....24x72.....	.569.....6.83
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ALCOA ALUMINUM SHEETS CORRUGATED ROOFING SHEETS

Corrugations 2 1/2 Inches x 1/2 Inch Deep

Coverage 24 Inches per Sheet Width

Thickness Decimal Inches	B&S Gage	Width & Length Inches	Approx. Wt. Square Foot	Lbs. per Sheet	Square Feet Per Sheet	Sheets per Square
.019.....	24.....	26x72 .....	.298.....	3.87.....	13.00.....	7.70
.019.....	24.....	26x96 .....	.298.....	5.16.....	17.33.....	5.77
.019.....	24.....	26x120.....	.298.....	6.45.....	21.66.....	4.61
.019.....	24.....	26x144.....	.298.....	7.74.....	26.00.....	3.85

INDUSTRIAL CORRUGATED ROOFING SHEETS

Corrugations 2.67 Inches x 7/8 Inch Deep

Thickness Decimal Inches	B&S Gage	Width & Length Inches	Approx. Wt. Square Foot	Lbs. per Sheet	Square Feet Per Sheet	Sheets per Square
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Coverage 32 Inches per Sheet Width

.032.....	20.....	35x60552.....	8.05.....	14.58.....	6.86
.032.....	20.....	35x72552.....	9.66.....	17.50.....	5.71
.032.....	20.....	35x84 .....	.552.....	11.27.....	20.42.....	4.90
.032.....	20.....	35x96 .....	.552.....	12.88.....	23.33.....	4.29
.032.....	20.....	35x108.....	.552.....	14.49.....	26.25.....	3.81
.032.....	20.....	35x120.....	.552.....	16.10.....	29.17.....	3.43
.032.....	20.....	35x132.....	.552.....	17.71.....	32.08.....	3.12
.032.....	20.....	35x144.....	.552.....	19.32.....	35.00.....	2.86

Coverage 42 2/3 Inches per Sheet Width

.024.....	22.....	45 2/3 x 72 .....	.414.....	9.45.....	22.83.....	4.38
.024.....	22.....	45 2/3 x 84 .....	.414.....	11.02.....	26.63.....	3.76
.024.....	22.....	45 2/3 x 96 .....	.414.....	12.60.....	30.44.....	3.29
.024.....	22.....	45 2/3 x 108.....	.414.....	14.18.....	34.24.....	2.92
.024.....	22.....	45 2/3 x 120.....	.414.....	15.75.....	38.05.....	2.63
.024.....	22.....	45 2/3 x 132.....	.414.....	17.33.....	41.85.....	2.39
.024.....	22.....	45 2/3 x 144.....	.414.....	18.90.....	45.66.....	2.19

COLORIB PANEL SHEETS — DIAMOND EMBOSSED

2.67 Inch Pitch x 9/16 Inch Depth

Coverage 48 Inches per Sheet Width

Colors: (One side only) Red, White, Light Green, Dark Green, Blue and Gray

Thickness Dec. Inch		Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
.0215.....		.50 3/4 x 96 .....	.338
.0215.....		.50 3/4 x 120.....	.338
.0215.....		.50 3/4 x 144.....	.338

BUILDING PRODUCTS

ROOFING AND SIDING SHEETS

Lengths As Required

Thickness Dec. Inch	Width Inches	Coverage per Sheet Width Inches	Pitch Inches	Depth Inches	Approx. Wt. Lbs. per Sq. Ft.
CORRUGATED INDUSTRIAL ROOFING					
.032.....	45.67	42.67	2.67.....	7/8.....	.552
V-BEAM INDUSTRIAL ROOFING AND SIDING — EMBOSSED FINISH					
.040.....	41 1/8	39	4 7/8	1 3/4 .....	.722
4 INCH RIBBED INDUSTRIAL SIDING — STUCCO EMBOSSED FINISH					
.032.....	41 1/8	40	4	1 .....	.575
8 INCH RIBBED INDUSTRIAL SIDING — EMBOSSED FINISH					
.032.....	41 1/8	40	8	1 .....	.519
PERFORATED CORRUGATED INDUSTRIAL SIDING — EMBOSSED					
.024.....	33 3/4	32	2.67.....	7/8.....	.373
RIB ROOFING — DIAMOND EMBOSSED					
.0215.....	50 3/4	48	2.67.....	9/16 .....	.348

ALCOA ALUMINUM PLATES**Alloy 1100-F — Spec. QQ-A-561c****MILL FINISH — Mill Sheared Edge****Unidentified, Not Interleaved**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	36x96	3.53	84.72	1/2	36x96	7.06	169.44
	48x144	3.53	169.44	3/4	36x96	10.58	253.92
5/16	36x96	4.41	105.74		60x120	10.58	529.00
3/8	36x96	5.29	126.96	1	36x96	14.11	338.64

Alloy 2024-T351 BARE — Spec. QQ-A-355c Cond. T**(Minimum Internal Stress — Stretched)****MILL FINISH — Interleaved and "AN" Identified**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
MILL SHEARED EDGE							
1/4	24x72	3.60	43.20	7/16	48x144	6.30	302.40
	36x96	3.60	86.40	1/2	24x72	7.20	86.40
	48x144	3.60	172.80		36x96	7.20	172.80
	60x180	3.60	270.00		48x144	7.20	345.60
5/16	24x72	4.50	54.00	5/8	24x72	9.00	108.00
	36x96	4.50	108.00		36x96	9.00	216.00
	48x144	4.50	216.00		48x144	9.00	432.00
3/8	24x72	5.40	64.80	3/4	24x72	10.80	129.60
	36x96	5.40	129.60		36x96	10.80	259.20
	48x144	5.40	259.20		48x144	10.80	518.40

MILL SAWED EDGE

7/8	24x72	12.60	151.20	1 1/2	48x144	21.60	1036.80
	36x96	12.60	302.40	1 3/4	24x72	25.20	302.40
1	24x72	14.40	172.80		36x96	25.20	604.80
	36x96	14.40	345.60		48x144	25.20	1209.60
	48x144	14.40	691.20	2	24x72	28.80	345.60
1 1/8	48x144	16.20	777.60		36x96	28.80	691.20
1 1/4	24x72	18.00	216.00		48x144	28.80	1382.40
	36x96	18.00	432.00	2 1/4	48x144	32.39	1554.72
	48x144	18.00	864.00	2 1/2	36x96	36.00	864.00
1 1/2	24x72	21.60	259.20	3	36x96	43.20	1036.80
	36x96	21.60	518.40	4	60x144	57.60	3456.00

Alloy 2024-T351 ALCLAD — Spec. QQ-A-362b Cond. T**(Minimum Internal Stress — Stretched)****MILL FINISH — Interleaved and "AN" Identified**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	48x144	3.60	172.80
1/2	36x96	7.20	172.80

Alloy 3003-F — Spec. QQ-A-359d**MILL FINISH — Mill Sheared Edge****Unidentified, Not Interleaved**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Sheet
1/4	36x96	3.56	85.44
1/4	48x144	3.56	172.80

Alloy 5005-H14**MILL FINISH — Interleaved**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	48x144	3.56	170.88	1/2	48x144	7.13	342.24
3/8	48x144	5.35	256.80				

ALCOA ALUMINUM PLATES**Alloy 5052-F — Spec. QQ-A-318c Cond. F****MILL FINISH — Unoiled, Unidentified, Not Interleaved**

Thickness Inches	Plate Size Inches	Sq. Ft.	Approx. Wt. Lbs. per Plate
1/4	48x144	3.49	167.52

Alloy 5052-H112 — Spec. QQ-A-318c Cond. 1/4 HARD**MILL FINISH — Unoiled, Unidentified, Not Interleaved**

Thickness Inches	Plate Size Inches	Sq. Ft.	Approx. Wt. Lbs. per Plate
1/4	48x144	3.49	167.52
1/4	84x156	3.49	317.59

Alloy 5083-0 — Spec. MIL-A-17358B**MILL FINISH — Interleaved and Identified**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	48x144	3.49	167.52	5/8	48x144	5.24	251.52
5/16	48x144	4.36	209.28	1/2	48x144	6.98	335.04

MILL SHEARED EDGE

1/4	48x144	3.49	167.52	5/8	48x144	5.24	251.52
5/16	48x144	4.36	209.28	1/2	48x144	6.98	335.04
3/4	48x144	10.47	502.56	1	48x144	13.96	670.08

Alloy 5083-H113 — Spec. MIL-A-17358B**MILL FINISH — Interleaved and Identified**

5/8	48x144	5.24	251.52	
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Alloy 5086-H32 — Spec. MIL-A-19070A**MILL FINISH — Interleaved and Identified**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	48x144	3.49	167.52	5/8	96x348	5.24	1215.68
	60x240	3.49	349.00	1/2	48x144	6.98	335.04
	72x240	3.49	418.80		48x240	6.98	558.40
	96x240	3.49	558.40		60x144	6.98	418.80
	96x348	3.49	809.68		60x240	6.98	698.00
5/16	48x144	4.37	209.76		72x240	6.98	837.60
3/8	48x144	5.24	251.52		72x240	6.98	837.60
	60x144	5.24	314.40		60x240	10.48	1048.00
	60x240	5.24	524.00		96x240	13.97	2235.20
	72x240	5.24	628.00	1	96x240	17.46	2793.36

Alloy 5456-H321 — Spec. MIL-A-19482B-1**Unidentified, Not Interleaved**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	60x144	3.49	209.40	3/4	60x144	10.48	628.80
5/8	60x144	5.24	314.40	1	60x144	13.97	838.20
1/2	60x144	6.98	418.80				

Alloy 6061-0 — Spec. QQ-A-327b Cond. A**MILL FINISH — Identified and Interleaved**

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
1/4	48x144	3.53	169.44	2	60x144	28.22	1693.20
3/4	36x96	10.58	253.92	2 1/4	60x144	31.75	1905.00
1	60x144	14.11	846.60	2 1/2	60x144	35.28	2116.80
1 1/2	60x144	21.17	1270.20	2 3/4	60x144	38.80	2328.00
1 3/4	60x144	24.69	1481.40	3	60x144	42.33	2539.80

†Alloy 5086-H112

ALCOA ALUMINUM PLATES**Alloy 6061-T651 — Spec. QQ-A-327b Cond. T**

(Minimum Internal Stress — Stretched)

MILL FINISH — Interleaved and Identified

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
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MILL SHEARED EDGE

$\frac{1}{4}$	36x96	3.53	84.72	$\frac{5}{8}$	36x96	8.82	211.68
	48x144	3.53	169.44		48x144	8.82	423.36
	60x144	3.53	211.80		60x144	8.82	529.20
	72x144	3.53	254.16	$\frac{3}{4}$	36x96	10.58	253.92
	96x240	3.53	564.80		48x144	10.58	507.84
$\frac{5}{16}$	36x96	4.41	105.84		60x144	10.58	634.80
	48x144	4.41	211.68		96x240	10.58	1692.80
$\frac{3}{8}$	36x96	5.29	126.96	$\frac{7}{8}$	48x144	12.35	592.80
	48x144	5.29	253.92	1	36x96	14.11	338.64
	60x144	5.29	317.40		48x144	14.11	677.28
	96x240	5.29	846.40		60x144	14.11	846.60
$\frac{1}{2}$	36x96	7.06	169.44		84x240	14.11	1975.40
	48x144	7.06	338.88	$1\frac{1}{4}$	36x96	17.64	423.36
	60x144	7.06	423.60		48x144	17.64	846.70
	96x240	7.06	1129.60		60x144	17.64	1058.40

MILL SAWED EDGE

$1\frac{1}{2}$	36x96	21.16	507.84	$2\frac{1}{2}$	36x96	35.28	846.72
	48x144	21.16	1015.70		48x144	35.28	1693.44
	60x144	21.16	1269.60		60x144	35.28	2116.80
$1\frac{3}{4}$	36x96	24.69	592.56	3	36x96	42.33	1015.92
	48x144	24.69	1185.10		48x144	42.33	2031.84
	60x144	24.69	1481.40		60x144	42.33	2539.80
2	36x96	28.22	677.28	4	48x144	56.44	2709.12
	48x144	28.22	1354.56		60x144	56.44	3386.40
	60x144	28.22	1693.20	5	48x144	70.56	3386.88
$2\frac{1}{4}$	48x144	31.75	1524.00	6	48x144	84.66	4063.68

Alloy 7075-T651 BARE — Spec. QQ-A-283a Cond. T

(Minimum Internal Stress — Stretched)

MILL FINISH — Interleaved and "AN" Identified

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
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MILL SHEARED EDGE

$\frac{1}{4}$	48x144	3.64	174.72	$\frac{1}{2}$	48x144	7.27	348.96
$\frac{5}{16}$	36x96	4.55	109.20	$\frac{5}{8}$	36x96	9.09	218.16
	48x144	4.55	218.40		48x144	9.09	436.32
$\frac{3}{8}$	36x96	5.45	130.80	$\frac{3}{4}$	36x96	10.91	261.84
	48x144	5.45	261.60		48x144	10.91	523.68
$\frac{1}{2}$	36x96	7.27	174.48				

MILL SAWED EDGE

$\frac{3}{8}$	36x96	12.73	305.52	$1\frac{1}{2}$	48x144	21.81	1046.88
	48x144	12.73	611.04	$1\frac{3}{4}$	36x96	25.43	610.80
1	36x96	14.54	348.96	2	24x72	29.08	348.96
	48x144	14.54	697.92		36x96	29.08	697.92
$1\frac{1}{4}$	24x72	18.18	218.16		48x144	29.08	1395.84
	48x144	18.18	872.64	$2\frac{1}{2}$	36x96	36.35	872.40
$1\frac{1}{2}$	24x72	21.81	261.72	3	36x96	43.62	1046.88
	36x96	21.81	523.44				

Alloy 7178-0 — Spec. MIL-A-9180A**MILL FINISH** — Oiled and Identified

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
$\frac{1}{4}$	48x144	3.64	174.72

We can furnish circles, rings and other shapes sawed from aluminum plates.

ALCOA ALUMINUM PLATES

Alloy 7178-T6 BARE — Spec. MIL-A-9180A

MILL FINISH — Oiled and Identified (Minimum Internal Stress — Stretched)

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
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MILL SHEARED EDGE

$\frac{1}{4}$	48x144....	3.64....	174.72	$\frac{3}{8}$	48x144....	5.45....	261.60
$\frac{5}{16}$	48x144....	4.55....	218.40	$\frac{1}{2}$	48x144....	7.27....	348.96

MILL SAWED EDGE

1	36x96	14.54....	348.96				
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TYPE 200 — WROUGHT TOOLING PLATES

Alloy 6061-T651 — Spec. QQ-A-327b Cond. T

MILL SAWED EDGE — Interleaved and Identified

Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Plate Size Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
$\frac{1}{2}$	60x144....	7.06....	423.60	$1\frac{3}{4}$	48x144....	24.69....	1185.12
$\frac{5}{8}$	60x144....	8.82....	529.20		60x144....	24.69....	1481.40
$\frac{3}{4}$	60x144....	10.58....	634.80	2	48x144....	28.22....	1354.56
1	60x144....	14.11....	846.60		60x144....	28.22....	1693.20
$1\frac{1}{4}$	48x144....	17.64....	846.72	$2\frac{1}{2}$	48x144....	35.28....	1693.44
	60x144....	17.64....	1058.40		60x144....	35.28....	2116.80
$1\frac{1}{2}$	48x144....	21.17....	1016.16	3	48x144....	42.33....	2031.84
	60x144....	21.17....	1270.20		60x144....	42.33....	2539.80

TYPE 300 — CAST TOOL & JIG PLATES

MACHINED BOTH SIDES — Standard Sizes 48 x 96 Inches (Other Sizes Available)

Thickness Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate	Thickness Inches	Approx. Wt. Sq. Ft.	Lbs. per Plate
$\frac{1}{4}$	3.63.....	116.16	$1\frac{1}{2}$	22.12.....	707.84
$\frac{3}{8}$	5.53.....	176.96	$1\frac{3}{4}$	25.84.....	826.88
$\frac{1}{2}$	7.37.....	235.84	2	29.50.....	944.00
$\frac{5}{8}$	9.00.....	288.00	$2\frac{1}{2}$	36.93.....	1181.76
$\frac{3}{4}$	10.82.....	346.24	3	44.33.....	1418.56
1	14.75.....	472.00	$3\frac{1}{2}$	51.34.....	1642.88
$1\frac{1}{4}$	18.47.....	591.04	4	59.00.....	1888.00



ABRASIVE TREAD PLATES

Alloy 3003

MILL FINISH — Unidentified, Not Interleaved

Thickness Dec. In. Inch	Plate Size Inches	Approx. Wt. Lbs. per Plate
.125.... $\frac{1}{8}$	48x144....	1.70.... 81.60
.188.... $\frac{5}{16}$	48x144....	2.60.... 124.80
.250.... $\frac{1}{4}$	48x144....	3.40.... 163.20

Alloy 6061-T6 TREAD PLATES

Diamond Pattern C-102 — MILL FINISH — Unidentified, Not Interleaved



Thickness Dec. In. Inch	Plate Size Inches	Approx. Wt. Lbs. per Plate
.100....—....	48x192....	1.52.... 97.28
.125.... $\frac{1}{8}$	36x144....	1.90.... 68.40
	48x192....	1.90.... 121.60
	60x192....	1.90.... 152.00
.188.... $\frac{5}{16}$	48x192....	2.80.... 179.20
	60x192....	2.80.... 224.00
.250.... $\frac{1}{4}$	48x192....	3.70.... 236.80
	60x192....	3.70.... 296.00
.375.... $\frac{3}{8}$	60x240....	5.50.... 550.00

ALUMINUM WIRE, BARS, SHAPES, PIPE, TUBES

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ALCOA ALUMINUM CASTING INGOTS — ALLOY 43

Spec. QQ-A-371d — Composition A

6 Pounds each.....	.2" thick x 2 5/8" wide x 15" long
30 Pounds each.....	.4 3/8" thick x 7 3/4" wide x 30" long

ALCOA ALUMINUM WELDING WIRES

Alloy 1100 (2S-0) Soft — Etched Finish

Spec. QQ-R-566-2 and MIL-E-0016053H

36-Inch Straight Lengths — Packed, 5 Lb. Tubes

Diam. Inches	Approx. Wt. Lbs. per Foot	Diam. Inches	Approx. Wt. Lbs. per Foot
1/8.....	.0145	3/16.....	.0324

Aluminum
Wire,
Bars,
Shapes,
Pipe,
Tubes

Alloy 4043 (43S-H19) — For Gas Welding

Spec. QQ-R-566-2 and MIL-E-0016053H

5 Per Cent Silicon — Not Caustic Dipped

Diam. Inches	Approx. Wt. Lbs. per Foot	Diam. Inches	Approx. Wt. Lbs. per Foot
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36-Inch Straight Lengths — Packed, 5 Lb. Tubes

1/32.....	.0081	3/16.....	.0324
1/8.....	.0145	1/4.....	.0577

Coiled — Random Weight — 55 to 110 Lbs.

1/16.....	.0036	1/8.....	.0145
3/32.....	.0081	3/16.....	.0324

Alloy 5356 — For Tungsten Arc or Consumable Electrode

Welding Only and Is Not Recommended for Gas Welding

Spec. MIL-E-0016053H

Especially useful in obtaining a good color match when welding 606L and 6063 alloys, particularly when subsequent anodizing is involved.

36-Inch Straight Lengths — Packed, 5 Lb. Tubes

Diam. Inches	Approx. Wt. Lbs. per Foot	Diam. Inches	Approx. Wt. Lbs. per Foot
1/16.....	.0036	3/32.....	.0225
3/32.....	.0081	3/16.....	.0324
1/8.....	.0145	1/4.....	.0577

ALCOA ALUMINUM BRAZING WIRE

Spec. QQ-R-566-2 — Commercial Finish

Diam. Inches	Alloy	Approx. Wt. Lbs. per Foot	Diam. Inches	Alloy	Approx. Wt. Lbs. per Foot
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36-Inch Straight Lengths — Packed, 5 Lb. Tubes

1/16.....	.716.....	.0036	3/32.....	.716.....	.0081
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Annealed Coils — Random Wt. 55 to 110 Lbs.

1/16.....	.716.....	.0036	3/32.....	.718.....	.0081
1/16.....	.718.....	.0036	1/8.....	.718.....	.0145

ALCOA ALUMINUM ROUND STRAIGHT WIRE

Alloy 1100 — Spec. QQ-A-411d

Stock Lengths, 12 Ft. Random — Not Identified

Diam. Inches	Alloy	Approx. Wt. Lbs. per Foot	Length	Diam. Inches	Alloy	Approx. Wt. Lbs. per Foot	Length
1/8.....	1100-H19.....	.0145....	.174	1/4.....	1100-H16.....	.0577....	.692
5/32.....	1100-H18.....	.0225....	.270	3/16.....	1100-H14.....	.0901....	.1081
3/16.....	1100-H18.....	.0324....	.388				

ALCOA ALUMINUM WIRES**COLD HEADING WIRE****Spec. QQ-A-430***Standard 55 to 110 Lb. Wrapped Coils*

Diameter Dec. In.	Approx. Wt. Lbs. per Ft.	Diameter Dec. In.	Approx. Wt. Lbs. per Ft.
Alloy 1100-H14			
.092	.0078	.154	.0223
.123	.0143	.184	.0314

Alloy 2017-H13

.092	.0078	.184	.0314
.123	.0143	.247	.0560
.154	.0223		

Alloy 2117-H15

.092	.0078	.184	.0314
.123	.0143	.247	.0560
.154	.0223		

Alloy 2024-H13

.092	.0078	.184	.0314
.123	.0143	.247	.0560
.154	.0223		

Alloy 5056-H32

.092	.0076	.184	.0304
.123	.0139	.247	.0540
.154	.0216		

Alloy 7075-H11

.143	.0195	.185	.0232
.161	.0249	.245	.0570
.166	.0259		

Alloy 7075-H15

.109	.0111	.151	.0231
.131	.0164	.160	.0249
.136	.0173	.221	.0468

ALLOY 1100-O SOFT COILED WIRE**Spec. QQ-A-411d Condition A Class A***5 Lb. and 55 Lb. Catchweight Coils*

Diameter Dec. In.	Approx. Wt. Lbs. per Ft.	Diameter Dec. In.	Approx. Wt. Lbs. per Ft.
.051	.0023	1/8	.013
.064	.0038	3/16	.032
.081	.0060	1/4	.058
.091	.0076		

ALLOY 2024-T4 COILED WIRE**Spec. QQ-A-268a-1***Standard 55 to 110 Lb. Coils*

Diameter Dec. In.	Approx. Wt. Lbs. per Ft.	Diameter Dec. In.	Approx. Wt. Lbs. per Ft.
.090	.0075	.118	.0129

ALLOY 5050-O COILED WIRE*20 Pound Non-Returnable Spools**.0625 Dec. Inch Diameter — Approx. Wt. .00357 Lbs. per Foot***ALLOY 5056-H18 COILED WIRE***Approx. 100 Lb. Coils**1/4-Inch Diameter — Approx. Wt. .0577 Lbs. per Foot*

ALCOA ALUMINUM RODS AND BARS

ALLOY 1100-F (2S-F) ROUND RODS

Spec. QQ-A-411d

AN-Identified (Except $\frac{3}{8}$ Inch Diam.) — Color Code White

Diameter Inches	Approx. Wt. Lbs. per Foot	Diameter Inches	Approx. Wt. Lbs. per Foot
	12 Ft.		12 Ft.
Standard 12 Foot Lengths			
$\frac{3}{8}$	.1297	$1\frac{1}{4}$	1.442
$\frac{7}{16}$	.1776	$1\frac{3}{8}$	1.740
$\frac{1}{2}$	.2306	$1\frac{1}{2}$	2.076
$\frac{9}{16}$	.2919	$1\frac{3}{4}$	2.830
$\frac{5}{8}$	.3604	$1\frac{7}{8}$	3.244
$\frac{3}{4}$	.5190	2	3.680
$\frac{7}{8}$	.7064	$2\frac{1}{4}$	4.671
1	.9227	$2\frac{1}{2}$	5.767
	11.07		
3 to 12 Foot Lengths			
3	8.304	4	14.760
$3\frac{1}{2}$	11.300	135.60	177.12

ALLOY 2011-T3 (11S-T3) SCREW MACHINE STOCK

Spec. QQ-A-365b

AN-Identified (Except $\frac{3}{8}$ Inch Diameter and Under)

Chamfered Both Ends Up Thru 2 Inches

Exact 12 Foot Lengths ($+\frac{1}{8}$ " — 0") — Color Code Brown

Size Inches	Approx. Wt. Lbs. per Foot	Size Inches	Approx. Wt. Lbs. per Foot
	12 Ft.		12 Ft.
Round			
$\frac{1}{8}$	.015	$\frac{7}{8}$	.735
$\frac{5}{32}$	.023	$1\frac{5}{16}$	.843
$\frac{3}{16}$	.033	1	.960
$\frac{7}{32}$	.046	$1\frac{1}{16}$	1.083
$\frac{1}{4}$	.059	$1\frac{1}{8}$	1.25
$\frac{5}{16}$	.092	$1\frac{3}{16}$	1.35
$1\frac{1}{32}$	.113	$1\frac{1}{4}$	1.53
$\frac{3}{8}$	.134	$1\frac{5}{16}$	1.65
$1\frac{3}{32}$	.159	$1\frac{3}{8}$	1.84
$\frac{7}{16}$	.182	$1\frac{7}{16}$	1.98
$1\frac{5}{32}$	.203	$1\frac{1}{2}$	2.19
$\frac{1}{2}$	.238	$1\frac{1}{16}$	2.34
$1\frac{7}{32}$	.260	$1\frac{3}{8}$	2.52
$\frac{9}{16}$	.301	$1\frac{3}{4}$	2.96
$1\frac{9}{32}$	.325	$1\frac{7}{8}$	3.37
$\frac{5}{8}$	.371	2	3.85
$2\frac{1}{32}$	.414	$2\frac{1}{8}$	4.34
$1\frac{1}{16}$	.449	$2\frac{1}{4}$	4.66
$2\frac{3}{32}$	.496	$2\frac{3}{8}$	5.41
$\frac{3}{4}$	.535	$2\frac{1}{2}$	5.99
$2\frac{5}{32}$	.586	$2\frac{3}{4}$	7.24
$1\frac{3}{16}$	.633	3	8.60
	7.524		103.20

Hexagon

$\frac{5}{16}$	.105	1.260	$\frac{3}{4}$	.592	7.104
$1\frac{1}{32}$	.125	1.500	$1\frac{3}{16}$	.699	8.390
$\frac{3}{8}$	.149	1.788	$\frac{7}{8}$	.805	9.660
$\frac{7}{16}$	.202	2.424	$1\frac{5}{16}$	.929	11.140
$\frac{1}{2}$	.264	3.168	1	1.055	12.660
$\frac{9}{16}$	.333	3.996	$1\frac{1}{8}$	1.333	15.996
$\frac{5}{8}$	.411	4.932	$1\frac{1}{4}$	1.642	19.704
$1\frac{1}{16}$	.498	5.976	$1\frac{3}{8}$	2.000	24.000

ALCOA ALUMINUM RODS AND BARS

ALLOY 2014-F ROUND FORGING STOCK

12 Foot Random Lengths — Color Code Orange

Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.
3/4	.535	6.420	3	8.553	102.636
1	.950	11.140	3 1/2	11.642	139.704
1 1/16	1.340	16.080	4	15.206	182.472
1 1/4	1.485	17.820	5	23.759	285.108
1 1/2	2.138	25.656	6	34.213	410.556
1 5/8	2.509	30.108	7	46.568	558.876
2	3.802	45.624	8	60.822	729.864
2 1/2	5.940	71.280			

ALLOY 2017 ROUND SCREW MACHINE STOCK

Spec. QQ-A-351d Condition T

AN-Identified (Except 3/8 In. Diam. and Under)

Chamfered Both Ends Up Thru 2 Inch — Color Code Yellow

Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.
2017-T4 — Exact 12 Foot Lengths (+ 1/8" — 0")					
3/64	.008	.096	1/4	.059	.708
1/8	.014	.174	5/32	.075	.900
5/64	.023	.278	5/16	.092	1.104
3/16	.033	.396	7/8	.134	1.608
7/32	.046	.552	7/16	.176	2.110

2017-T451 — Exact 12 Foot Lengths (+ 1/8" — 0")

1/2	.238	2.856	1 1/16	2.713	32.52
5/16	.301	3.612	1 3/4	2.921	34.92
5/8	.371	4.452	1 13/16	3.119	37.44
11/16	.449	5.388	1 7/8	3.336	40.08
3/4	.535	6.420	1 15/16	3.554	42.60
13/16	.627	7.524	2	3.802	45.60
7/8	.728	8.736	2 1/16	4.049	48.59
15/16	.835	10.020	2 1/8	4.291	51.49
1	.950	11.40	2 1/4	4.810	57.72
1 1/16	1.070	12.84	2 5/8	5.361	64.33
1 1/8	1.208	14.40	2 1/2	5.940	71.28
1 3/16	1.337	16.08	2 5/8	6.549	78.59
1 1/4	1.475	17.76	2 3/4	7.187	86.24
1 5/16	1.643	19.68	2 7/8	7.626	91.51
1 3/8	1.792	21.60	3	8.553	102.64
1 7/16	1.980	23.52	3 1/8	9.286	111.43
1 1/2	2.138	25.68	3 1/4	10.038	120.46
1 5/8	2.317	27.84	3 3/8	10.821	129.85
1 1/8	2.505	30.12			

2017-T451 — Rolled — 3 to 12 Foot Random Lengths

3 1/2	11.642	139.70	4 1/2	19.245	230.94
3 5/8	12.501	150.00	4 3/4	21.443	257.32
3 3/4	13.365	160.38	5	23.759	285.11
4	15.206	182.47	5 1/2	28.839	346.07
4 1/4	17.166	205.99	6	34.213	410.56

2017-T4 — Rolled — 3 to 12 Foot Random Lengths

7	46.568	558.82	8	60.822	729.86
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Looking for expert advice on screw machine stock?

Our bar stock specialists and metallurgists will appreciate helping you with your screw machine stock problems.

ALCOA ALUMINUM RODS AND BARS
ALLOY 2017 HEXAGON SCREW MACHINE STOCK
Spec. QQ-A-351d Cond. T

AN-Identified — Color Code Yellow

Chamfered Both Ends Up Thru 2 Inch

Size Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.	Size Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.
2017-T4 — Exact 12 Foot Lengths (+ 1/8" — 0")					
3/16	.037	.44	5/8	.147	1.76
1/4	.065	.78	7/16	.201	2.41
5/16	.102	1.22			
2017-T451 — Exact 12 Foot Lengths (+ 1/8" — 0")					
1/2	.262	3.14	1 1/4	1.635	19.62
5/16	.332	3.98	1 5/16	1.750	21.00
5/8	.409	4.91	1 3/8	1.979	23.75
11/16	.495	5.94	1 7/16	2.100	25.20
3/4	.589	7.07	1 1/2	2.355	28.26
13/16	.692	8.30	1 5/8	2.767	33.20
7/8	.802	9.66	1 3/4	3.209	38.51
15/16	.920	11.04	1 7/8	3.684	44.21
1	1.047	12.56	2	4.192	50.30
1 1/16	1.182	14.18	2 1/2	6.358	76.24
1 1/8	1.325	15.90	2 3/4	7.690	92.28
1 3/16	1.476	17.69			

ALLOY 2017 SQUARE BARS

Spec. QQ-A-351d Cond. T

Standard 12 Ft. Lengths — AN-Identified — Color Code Yellow

Size Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.	Size Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.
2027-T4					
3/8	.170	2.04	7/16	.232	2.78
2017-T451					
1/2	.303	3.63	1	1.210	14.52
5/8	.473	5.68	1 1/4	1.890	22.68
3/4	.681	8.17	1 1/2	2.723	32.68
7/8	.926	11.11	2	4.840	58.08

ALLOY 2024 ROUND SCREW MACHINE STOCK

Spec. QQ-A-268a-1 Cond. T

AN-Identified (Except 3/8 Inch Diameter and Under) — Color Code Red

Chamfered Both Ends Up Thru 2 Inch

Diameter Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.
2024-T4 — Exact 12 Foot Lengths (+ 1/8" — 0")					
1/8	.015	.18	5/16	.092	1.10
3/16	.033	.40	3/8	.132	1.58
1/4	.059	.71	7/16	.180	2.16
2024-T351 — Exact 12 Foot Lengths (+ 1/8" — 0")					
1/2	.235	2.82	1 1/2	2.12	25.44
5/16	.298	3.58	1 5/16	2.30	27.60
5/8	.368	4.42	1 3/8	2.49	29.88
11/16	.445	5.34	1 11/16	2.68	32.16
3/4	.529	6.35	1 3/4	2.88	34.56
13/16	.621	7.45	1 13/16	3.09	37.08
7/8	.721	8.65	1 7/8	3.31	39.72
15/16	.811	9.73	2	3.76	46.20
1	.941	11.29	2 1/16	4.00	48.00
1 1/16	1.06	12.72	2 1/8	4.25	51.00
1 1/8	1.19	14.28	2 1/4	4.76	57.12
1 3/16	1.33	15.93	2 5/16	5.03	60.36
1 1/4	1.47	17.64	2 3/8	5.31	63.72
1 5/16	1.62	19.44	2 1/2	5.88	70.56
1 3/8	1.78	21.36	2 5/8	6.49	77.88
1 7/16	1.94	23.34	2 3/4	7.12	85.44

ALCOA ALUMINUM RODS AND BARS**ALLOY 2024 ROUND SCREW MACHINE STOCK (Cont.)****Spec. QQ-A-268a-1 Cond. T**

AN-Identified — Color Code Red

Diameter Inches	Approx. Wt. Lbs. per Foot	Diameter Inches	Approx. Wt. Lbs. per Foot
12 Ft.		12 Ft.	
2024-T351 — Exact 12 Foot Lengths (+ 1/8" - 0")			
2 7/8	7.78	93.36	3 1/8..... 9.01..... 108.12
3	8.47	101.64	3 1/4..... 9.94..... 119.28
2024-T351 — 3 to 12 Foot Random Lengths			
3 1/2..... 11.53	138.36	5 1/4..... 25.94..... 311.28	
3 5/8..... 12.58	150.96	5 1/2..... 28.56..... 342.72	
3 3/4..... 13.23	158.76	6..... 33.88..... 406.56	
4..... 15.06	180.72	6 1/2..... 39.76..... 477.12	
4 1/4..... 17.00	204.00	7..... 46.12..... 553.44	
4 1/2..... 19.06	228.72	7 1/2..... 52.94..... 635.28	
4 3/4..... 21.23	254.76	8..... 60.23..... 722.76	
5..... 23.53	282.36		

ALLOY 2024 HEXAGON SCREW MACHINE STOCK**Spec. QQ-A-268a-1 Cond. T**

AN-Identified — Color Code Red

Size Inches	Approx. Wt. Lbs. per Foot	Size Inches	Approx. Wt. Lbs. per Foot
12 Ft.		12 Ft.	
2024-T4 — Exact 12 Foot Lengths (+ 1/8" - 0")			
3/16..... .036	.44	3/8..... .146..... 1.75	
1/4..... .064	.77	7/16..... .199..... 2.39	
5/16..... .101	1.21		
2024-T351 — Exact 12 Foot Lengths (+ 1/8" - 0")			
1/2..... .259	3.11	1 1/2..... 2.332..... 27.98	
5/16..... .328	3.94	1 5/8..... 2.740..... 32.88	
5/8..... .405	4.86	1 3/4..... 3.178..... 38.14	
1 1/16..... .491	5.89	1 7/8..... 3.648..... 43.78	
3/4..... .584	7.01	2..... 4.151..... 49.81	
7/8..... .794	9.53	2 1/8..... 4.787..... 57.44	
1 5/16..... .911	10.93	2 1/4..... 5.253..... 63.04	
1..... 1.037	12.44	2 1/2..... 6.458..... 77.80	
1 1/8..... 1.312	15.74	2 3/4..... 7.847..... 94.16	
1 1/4..... 1.619	19.43	3..... 9.340..... 112.08	
1 3/8..... 1.960	23.52		

ALLOY 2024 SQUARE BARS (Square Edge)**Spec. QQ-A-268a-1 Cond. T**

AN-Identified — Color Code Red

Size Inches	Approx. Wt. Lbs. per Foot	Size Inches	Approx. Wt. Lbs. per Foot
12 Ft.		12 Ft.	
2024-T4 — Standard 12 Foot Lengths			
1/4..... .074	.88	3/8..... .169..... 2.03	
2024-T351 — Standard 12 Foot Lengths			
1/2..... .300	3.60	1 1/2..... 2.696..... 32.35	
5/16..... .379	4.55	1 3/4..... 3.670..... 44.04	
5/8..... .468	5.62	2..... 4.793..... 57.52	
3/4..... .674	8.09	2 1/4 (Ex)..... 6.076..... 72.90	
7/8..... .917	11.00	2 1/2 (Ex)..... 7.500..... 90.00	
1..... 1.198	14.35	2 3/4 (Ex)..... 9.076..... 108.90	
1 1/8..... 1.531	18.38	3 (Ex)..... 10.800..... 129.60	
1 1/4..... 1.872	22.46		

2024-T351 — 3 to 12 Foot Random Lengths

3 1/4..... 12.66	151.92	4..... 19.18	230.16
3 1/2..... 14.68	176.16		

(Ex) Extruded Spec. QQ-A-267a

ALCOA ALUMINUM BARS**ALLOY 2024 (24S-T4) RECTANGULAR BARS (Square Edges)****Spec. QQ-A-268a-1 Cond. T****AN-Identified — Color Code Red**

Dimensions Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Dimensions Inches	Approx. Wt. Lbs. per Foot	12 Ft.
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2024-T4 — Standard 12 Foot Lengths

$\frac{1}{8} \times \frac{1}{2}$.075	.90	$\frac{1}{4} \times 2$.599	7.18
$\frac{5}{8}$.094	1.12	$2\frac{1}{2}$.749	8.99
$\frac{3}{4}$	.112	1.34	3	.899	10.78
1	.150	1.80	4	1.198	14.37
$1\frac{1}{4}$	.187	2.24	$\frac{5}{16} \times \frac{1}{2}$	.187	2.24
$1\frac{1}{2}$	.225	2.70	$\frac{3}{4}$	.281	3.37
2	.300	3.60	1	.374	4.49
$\frac{3}{16} \times \frac{1}{2}$	.112	1.34	$1\frac{1}{2}$	.562	6.74
$\frac{5}{8}$	.140	1.68	2	.749	8.99
$\frac{3}{4}$	.169	2.02	$\frac{3}{8} \times \frac{1}{2}$	.225	2.70
1	.225	2.70	$\frac{5}{8}$	.281	3.37
$1\frac{1}{4}$	.281	3.37	$\frac{3}{4}$	.337	4.04
$1\frac{1}{2}$	.337	4.04	1	.449	5.38
2	.449	5.38	$1\frac{1}{4}$	.562	6.74
$\frac{1}{4} \times \frac{3}{8}$	.129	1.55	$1\frac{1}{2}$	.674	8.08
$\frac{1}{2}$	.150	1.80	$1\frac{3}{4}$	.786	9.43
$\frac{5}{8}$	.187	2.24	2	.899	10.78
$\frac{3}{4}$	.225	2.70	$2\frac{1}{2}$	1.123	13.48
$\frac{7}{8}$	.257	3.08	3	1.348	16.17
1	.300	3.60	4	1.797	21.56
$1\frac{1}{4}$	.374	4.48	6	2.696	32.35
$1\frac{1}{2}$	.449	5.38			

2024-T351 — Standard 12 Foot Lengths

$\frac{1}{2} \times \frac{5}{8}$	.374	4.48	$\frac{3}{4} \times 3$	2.696	32.35
$\frac{3}{4}$	.449	5.38	$3\frac{1}{2}$	3.145	37.74
$\frac{7}{8}$	.514	6.17	*6	5.392	64.70
1	.599	7.18	1 $\times 1\frac{1}{4}$	1.498	17.97
$1\frac{1}{4}$	.749	8.98	$1\frac{1}{2}$	1.798	21.57
$1\frac{1}{2}$	.899	10.79	$1\frac{3}{4}$	2.097	25.16
$1\frac{3}{4}$	1.048	12.57	2	2.397	28.76
2	1.198	14.37	$2\frac{1}{2}$	2.996	35.95
$2\frac{1}{2}$	1.498	17.97	3	3.595	43.14
3	1.797	21.56	$3\frac{1}{2}$	4.194	50.33
4	2.396	28.75	*4	4.793	57.52
6	3.595	43.14	*6	7.190	86.28
*8	4.793	57.52	1 $\frac{1}{4} \times 1\frac{1}{2}$	2.247	26.96
$\frac{5}{8} \times \frac{3}{4}$	.562	6.74	2	2.996	35.95
$\frac{7}{8}$	.655	7.86	$2\frac{1}{2}$	3.745	44.94
1	.749	8.98	*3	4.494	53.92
$1\frac{1}{4}$	.936	11.23	1 $\frac{1}{2} \times 2$	3.595	43.14
$1\frac{1}{2}$	1.123	13.47	* $2\frac{1}{2}$	4.494	53.92
2	1.498	17.97	* $2\frac{3}{4}$	4.943	59.31
3	2.203	26.44	*3	5.392	64.70
$\frac{3}{4} \times 1$	.898	10.78	*4	7.050	84.60
$1\frac{1}{2}$	1.348	16.17	*6	10.785	129.42
2	1.797	21.56	*8	14.380	172.56
$2\frac{1}{2}$	2.246	26.95			

2024-T351 — 12 Foot Random Lengths

$1\frac{3}{4} \times 2\frac{1}{2}$	5.242	62.90	$2\frac{1}{2} \times 4\frac{1}{2}$	13.481	161.77
2 $\times 2\frac{1}{4}$	5.398	64.78	5	14.979	179.75
$2\frac{1}{2}$	5.991	71.89	6	17.974	215.69
3	7.190	86.28	$2\frac{3}{4} \times 4$	13.181	158.17
4	9.400	112.80	3 $\times 4$	14.380	172.56
6	14.380	172.56	$4\frac{1}{2}$ (Ex)	16.177	194.12
$2\frac{1}{4} \times 4$	10.785	129.42	6	21.569	258.83
$2\frac{1}{2} \times 4$	11.983	143.80			

* 12 Foot Random Lengths

(Ex) Extruded—Spec. QQ-A-267a

ALCOA ALUMINUM RODS AND BARS**ALLOY 5086-H112 EXTRUDED****Spec. MIL-A-21579****12 Foot Lengths**

Size Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Size Inches	Approx. Wt. Lbs. per Foot	12 Ft.
ROUND RODS					
1/4	.057	.684	1 1/4	1.422	17.064
3/8	.128	1.536	1 1/2	2.047	24.564
1/2	.228	2.736	2 1/2	5.683	68.196
5/8	.355	4.260	2 3/4	6.921	83.052
3/4	.512	6.144	3 1/4	9.955	119.460
1	.910	10.920			

SQUARE BARS (Square Edge)

1/2	.290	3.480
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RECTANGULAR BARS (Square Edge)

1/8 x 1	.146	1.752	1/4 x 3	.872	10.464
1 1/2	.218	2.616	4	1.188	14.256
2	.290	3.480	5/16 x 2	.743	8.916
3/16 x 3/4	.164	1.968	3/8 x 1	.437	5.244
1	.218	2.616	1 1/2	.653	7.836
1 1/4	.272	3.264	1 3/4	.763	9.156
1 1/2	.327	3.924	2	.872	10.464
2	.436	5.232	3	1.308	15.696
1/4 x 3/4	.218	2.616	4	1.744	20.928
1	.290	3.480	1/2 x 1	.581	6.927
1 1/4	.363	4.356	1 1/2	.872	10.464
1 1/2	.437	5.244	2	1.163	13.956
1 3/4	.507	6.084	3	1.744	20.928
2	.581	6.927	4	2.327	27.924
2 1/2	.743	8.916	1 x 4	4.652	55.824

HALF OVALS

1/4 x 1	.238	2.856
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ALLOY 6061 (61S-T6) ROUND SCREW MACHINE STOCK**Spec. QQ-A-325b, Cond. T****AN-Identified — (Except 3/8 Inch Diameter and Under)****Chamfered Both Ends Up Thru 2 Inches — Color Code Blue**

Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.
6061-T6 — Exact 12 Foot Lengths (+ 1/8" — 0")					
1/8	.0145	.17	5/16	.090	1.08
3/16	.0324	.39	3/8	.129	1.55
1/4	.058	.70	7/16	.176	2.11
6061-T651 — Exact 12 Foot Lengths (+ 1/8" — 0")					
1/2	.230	2.76	1 5/8	2.430	29.16
9/16	.292	3.51	1 3/4	2.814	33.77
5/8	.359	4.31	1 7/8	3.320	39.84
3/4	.517	6.20	2	3.676	44.11
7/8	.704	8.45	2 1/8	4.160	49.92
1 1/16	.811	9.73	2 1/4	4.65	54.72
1	.919	11.03	2 1/2	5.74	68.88
1 1/8	1.170	14.04	2 5/8	6.36	76.32
1 1/4	1.436	17.23	2 3/4	6.99	83.88
1 5/16	1.589	19.07	3	8.27	99.24
1 3/8	1.738	20.85	3 1/8	9.01	108.12
1 1/2	2.068	24.82	3 1/4	9.75	117.00

6061-T651 Rolled — 3 to 12 Foot Random Lengths

3 1/2	11.40	136.80	5 1/2	27.99	335.88
3 3/4	12.98	155.76	6	33.21	398.52
4	14.70	176.40	6 1/2	38.98	467.76
4 1/2	18.68	224.16	7	45.22	542.64
5	23.07	276.84	8	59.05	708.60

ALCOA ALUMINUM BARS

ALLOY 6061 (61S-T6) HEXAGON SCREW MACHINE STOCK

Cold Finish — Spec. QQ-A-325b, Cond. T

AN-Identified — Chamfered Both Ends — Color Code Blue

Size Inches	Approx. Wt. Lbs. per Foot	Size 12 Ft.	Approx. Wt. Lbs. per Foot	Size 12 Ft.
6061-T6 — Exact 12 Foot Lengths (+ 1/8" - 0")				
1/4	.063	.76	.143	1.72
6061-T651 — Exact 12 Foot Lengths (+ 1/8" - 0")				
1/2	.254	3.05	1 1/4	1.588
5/8	.397	4.77	1 1/2	2.286
3/4	.572	6.86	1 3/4	3.116
1	1.016	12.19	2	4.070
				48.84

ALLOY 6061 (61S-T6) EXTRUDED BARS (Square Edge)

Spec. QQ-A-270a-1, Cond. T

AN-Identified — Color Code Blue

SQUARE 6061-T6 — 12 Foot Lengths

1/4	.075	.90	3/8	.168	2.02
5/16	.118	1.42			
SQUARE 6061-T651 — 12 Foot Lengths					
1/2	.300	3.60	1 3/4	3.67	43.32
5/8	.468	5.62	2	4.80	57.60
3/4	.675	8.10	3 1/4	12.68	152.16
7/8	.930	11.04	3 1/2	14.70	176.40
1	1.20	14.40	4	19.20	230.40
1 1/2	2.70	32.40			

RECTANGULAR 6061-T6 — 12 Foot Lengths

1/8x1	.150	1.80	1/4x4	1.200	14.40
1 1/4	.187	2.24	5	1.500	18.00
1 1/2	.225	2.70	6	1.800	21.60
2	.300	3.60	5 1/2 x 3/4	.280	3.36
3/16x 3/4	.169	2.03	1	.374	4.49
1	.226	2.71	1 1/4	.468	5.62
+1 1/4	.282	3.38	1 1/2	.562	6.74
1 1/2	.338	4.05	2	.749	8.99
2	.451	5.41	3/8 x 1/2	.225	2.70
1/4 x 1/2	.150	1.80	3/4	.337	4.04
3/4	.225	2.70	1	.450	5.40
1	.300	3.60	1 1/4	.564	6.77
1 1/4	.376	4.51	1 1/2	.675	8.10
1 1/2	.450	5.40	2	.900	10.80
2	.600	7.20	3	1.35	16.20
2 1/2	.750	9.00	4	1.80	21.60
3	.900	10.80	6	2.70	32.40

RECTANGULAR 6061-T6510 — 12 Foot Lengths

1/2x 3/4	.45	5.40	5/8x2	1.50	18.00
1	.60	7.20	3/4x1	.90	10.80
1 1/4	.75	9.00	1 1/4	1.13	13.56
1 1/2	.90	10.80	1 1/2	1.35	16.20
2	1.20	14.40	2	1.80	21.60
2 1/2	1.50	18.00	2 1/2	2.25	27.00
3	1.80	21.60	3	2.70	32.40
3 1/2	2.10	25.20	3 1/2	3.15	37.80
4	2.40	28.80	4	3.60	43.20
5	3.00	36.00	1 x 1 1/4	1.50	18.00
6	3.60	43.20	1 1/2	1.80	21.60
5/8x1	.75	9.00	2	2.40	28.80
1 1/4	.94	11.24	3	3.60	43.20
1 1/2	1.12	13.20			

RECTANGULAR 6061-T6510 — 6 to 12 Foot Random Lengths

1 x 4	4.80	57.60	1 1/2x2 1/2	4.41	52.92
6	7.20	86.40	3	5.40	64.80
1 1/4x2	3.00	36.00	6	10.80	129.60

†Also stocked in 20 Foot Lengths

ALCOA ALUMINUM RODS AND BARS**ALLOY 6063-T5 (63S-T5) EXTRUDED****Spec. QQ-A-274****Heat Treated — No. 1 Finish****16 Foot Lengths — Color Code Green**

Size Inches	Approx. Wt. Lbs. per Foot	16 Ft.	Size Inches	Approx. Wt. Lbs. per Foot	16 Ft.
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ROUND RODS

1/2.....	.235.....	3.760	3/4.....	.530.....	8.480
5/8.....	.368.....	5.888	1.....	.942.....	15.072

SQUARE BARS (Square Edge)

1/4.....	.073.....	1.17	3/4.....	.658.....	10.53
5/8.....	.1650.....	2.64	1.....	1.170.....	18.72
1/2.....	.2925.....	4.68	1 1/4.....	1.872.....	29.95
5/8.....	.457.....	7.49	1 1/2.....	2.698.....	43.16

RECTANGULAR BARS (Square Edge)

1/8 x 1/2.....	.075.....	1.20	1/4 x 2.....	.600.....	9.60
5/8.....	.094.....	1.50	2 1/2.....	.750.....	12.00
3/4.....	.113.....	1.80	3.....	.900.....	14.40
1.....	.150.....	2.40	3/8 x 1/2.....	.224.....	3.58
1 1/4.....	.187.....	2.99	5/8.....	.281.....	4.49
1 1/2.....	.226.....	3.61	3/4.....	.338.....	5.40
1 3/4.....	.263.....	4.20	1.....	.450.....	7.20
2.....	.300.....	4.80	1 1/4.....	.563.....	9.00
3/16 x 1/2.....	.113.....	1.80	1 1/2.....	.675.....	10.80
3/4.....	.169.....	2.70	2.....	.900.....	14.40
1.....	.226.....	3.61	3.....	1.350.....	21.60
1 1/4.....	.282.....	4.51	1/2 x 3/4.....	.450.....	7.20
1 1/2.....	.338.....	5.40	1.....	.600.....	9.60
2.....	.451.....	7.20	1 1/4.....	.750.....	12.00
2 1/2.....	.564.....	9.02	1 1/2.....	.900.....	14.40
1/4 x 1/2.....	.150.....	2.40	2.....	1.200.....	19.20
5/8.....	.187.....	2.99	2 1/2.....	1.500.....	24.00
3/4.....	.225.....	3.60	3.....	1.800.....	28.80
1.....	.300.....	4.80	3/4 x 1 1/2.....	1.350.....	21.60
1 1/4.....	.375.....	6.00	2.....	1.800.....	28.80
1 1/2.....	.450.....	7.20	1 x 1 1/2.....	1.800.....	28.80
1 3/4.....	.525.....	8.40	2.....	2.400.....	38.40

ALLOY 6262-T9 ROUND SCREW MACHINE STOCK**AN-Identified — Exact 12 Foot Lengths (+ 1/8" - 0")**

Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Diameter Inches	Approx. Wt. Lbs. per Foot	12 Ft.
1/4.....	.058.....	.70	1 3/8.....	1.738.....	20.86
5/8.....	.129.....	1.55	1 1/2.....	2.068.....	24.82
1/2.....	.230.....	2.76	1 3/4.....	2.814.....	33.77
5/8.....	.359.....	4.31	2.....	3.676.....	44.11
3/4.....	.517.....	6.20	2 1/4.....	4.671.....	56.05
7/8.....	.704.....	8.45	2 1/2.....	5.740.....	68.88
1.....	.919.....	11.03	3.....	8.270.....	99.24
1 1/4.....	1.436.....	17.23			

Stocks are being expanded regularly. If the material you want is not listed in this book, please contact the Ducommun office nearest you for information or its availability.

ALCOA ALUMINUM RODS AND BARS

ALLOY 7075 (75S-T6) — Spec. QQ-A-282a, Cond. T

AN-Identified (Except $\frac{3}{8}$ Inch Diameter) — Color Code Black

Size Inches	Approx. Wt. Lbs. per Foot	12 Ft.	Size Inches	Approx. Wt. Lbs. per Foot	12 Ft.
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ROUND 7075-T6 — Standard 12 Foot Lengths

$\frac{3}{8}$.134	1.61			
$\frac{1}{2}$.238	2.86	$1\frac{1}{8}$	2.510	30.12
$\frac{5}{16}$.301	3.61	$1\frac{3}{4}$	2.911	34.93
$\frac{3}{8}$	.373	4.48	$1\frac{7}{8}$	3.341	40.09
$\frac{7}{16}$	.535	6.42	2	3.802	45.61
$\frac{1}{4}$	.730	8.76	$2\frac{1}{4}$	4.81	57.73
$1\frac{1}{8}$	.950	11.40	$2\frac{3}{8}$	5.36	64.34
$1\frac{1}{4}$	1.203	14.44	$2\frac{1}{2}$	5.94	71.28
$1\frac{3}{8}$	1.484	17.81	$2\frac{5}{8}$	6.60	79.20
$1\frac{1}{2}$	1.797	21.56	$2\frac{3}{4}$	7.18	86.16
$1\frac{1}{2}$	2.138	25.66	3	8.55	102.60

ROUND 7075-T651 — 12 Foot Random Lengths

$3\frac{1}{4}$	10.04	120.48	$4\frac{1}{2}$	19.25	231.00
$3\frac{1}{2}$	11.64	139.68	$4\frac{3}{4}$	21.44	257.28
$3\frac{3}{4}$	13.57	162.84	5	23.96	287.52
4	15.21	182.52			

SQUARE (Square Edge) 7075-T651 — Standard 12 Foot Lengths

$\frac{1}{2}$	.303	3.64	$1\frac{1}{2}$	2.723	32.68
$\frac{3}{4}$	.681	8.17	$1\frac{3}{4}$	3.706	44.47
1	1.210	14.52	2	4.84	58.08
$1\frac{1}{4}$	1.891	22.69			

SQUARE (Square Edge) 7075-T651 — 6 to 12 Foot Random Lengths

$2\frac{1}{2}$ (Ex)	7.50	90.00	3	10.80	129.60
$2\frac{3}{4}$ (Ex)	9.07	108.84	4	19.20	230.40

RECTANGULAR (Square Edge) 7075-T6 — 12 Foot Random Lengths

$\frac{1}{4} \times \frac{5}{8}$	.189	2.27	$\frac{5}{16} \times \frac{1}{2}$	.189	2.27
1	.303	3.64	$\frac{3}{8} \times 1$	.454	5.45
$1\frac{1}{2}$	.454	5.45	2	.908	10.90
3	.908	10.90	3	1.361	16.33

RECTANGULAR (Square Edge) 7075-T651 — 12 Foot Random Lengths

$\frac{1}{2} \times \frac{3}{4}$	.454	5.45	$\frac{5}{8} \times 2$	1.513	18.16
1	.605	7.26	$\frac{3}{4} \times 1$	.908	10.90
$1\frac{1}{2}$	.908	10.90	$1\frac{1}{4}$	1.137	13.64
$1\frac{3}{4}$	1.059	12.71	$1\frac{1}{2}$	1.361	16.33
2	1.210	14.52	2	1.815	21.78
$2\frac{1}{2}$	1.513	18.16	3	2.723	32.68
3	1.815	21.78	$3\frac{1}{2}$	3.170	38.04
4	2.420	29.04	6	5.445	65.34
5	3.025	36.30	1 $\times 1\frac{1}{4}$	1.513	18.16
$\frac{5}{8} \times \frac{3}{4}$	.567	6.80	$1\frac{1}{2}$	1.815	21.78
1	.756	9.07	$1\frac{3}{4}$	2.118	25.42
$1\frac{1}{4}$	.945	11.34	2	2.420	29.04
$1\frac{1}{2}$	1.134	13.61	$2\frac{1}{2}$	3.025	36.30

RECTANGULAR (Square Edge) 7075-T651 — 6 to 12 Foot Random Lengths

1 x 3	3.630	43.56	2 x 3	7.260	87.12
4	4.840	58.08	4	9.680	116.16
6	7.260	87.12	$4\frac{1}{4}$	10.285	123.42
$1\frac{1}{4} \times 1\frac{1}{2}$	2.269	27.23	6	14.521	174.25
$1\frac{3}{4}$	2.640	31.68	$2\frac{1}{4} \times 2\frac{1}{2}$ (Ex)	6.800	81.60
2	3.025	36.30	4	10.890	130.68
$2\frac{1}{2}$	3.781	45.37	$2\frac{1}{2} \times 2\frac{3}{4}$ (Ex)	8.319	99.83
3	4.538	54.46	3 (Ex)	9.075	108.90
$1\frac{1}{2} \times 2$	3.630	43.56	$3\frac{1}{2}$ (Ex)	10.588	127.06
$2\frac{1}{2}$	4.538	54.46	4	12.100	145.20
3	5.448	65.38	5	15.126	181.51
4	7.260	87.12	6	18.151	217.81
6	10.890	130.68	3 x $3\frac{1}{2}$ (Ex)	12.705	152.46
$1\frac{3}{4} \times 2\frac{1}{4}$	4.720	56.64	4	14.521	174.25
3	6.353	76.24	$4\frac{1}{2}$	16.336	196.03
4	8.470	101.46	5	18.151	217.81
2 x $2\frac{1}{4}$	5.451	65.41	6	21.781	261.37
$2\frac{1}{2}$	6.050	72.60	(Ex) Extruded—Spec. QQ-A-277a		

ALCOA ALUMINUM STRUCTURAL SHAPES

ALLOY 5086-H112 EXTRUDED

Spec. MIL-A-21579

25 Foot Lengths

Dimensions Inches	Approx. Wt. Foot	Lbs. per Length	Dimensions Inches	Approx. Wt. Foot	Lbs. per Length
EQUAL ANGLES					
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$	.210	5.25	$2 \times 2 \times \frac{3}{8}$	1.574	39.35
$1 \times 1 \times \frac{1}{8}$	.277	6.93	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{16}$	1.100	27.50
$\frac{3}{16}$	.396	9.90	$\frac{1}{4}$	1.386	34.65
$\frac{1}{4}$	.505	12.63	$\frac{5}{16}$	1.713	42.83
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	.348	8.70	$\frac{3}{8}$	2.029	50.72
$\frac{3}{16}$	.508	12.70	$3 \times 3 \times \frac{3}{16}$	1.267	31.68
$\frac{1}{4}$	.657	16.43	$\frac{1}{4}$	1.663	41.58
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$	.426	10.65	$\frac{5}{16}$	2.059	51.48
$\frac{3}{16}$	.614	15.35	$\frac{3}{8}$	2.445	61.13
$\frac{1}{4}$	.802	20.05	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{4}$	2.050	51.25
$1\frac{3}{4} \times 1\frac{3}{4} \times \frac{1}{4}$	.950	23.75	$\frac{5}{16}$	2.457	61.43
$2 \times 2 \times \frac{1}{8}$	.564	14.10	$\frac{3}{8}$	2.900	72.50
$\times \frac{3}{16}$	.842	21.05	$4 \times 4 \times \frac{1}{4}$	2.257	56.43
$\frac{1}{4}$	1.099	27.48	$\frac{3}{8}$	3.346	83.65
$\frac{5}{16}$	1.346	33.65			
UNEQUAL ANGLES					
$2 \times 1\frac{1}{2} \times \frac{3}{16}$	.750	18.75	$3 \times 2\frac{1}{2} \times \frac{1}{4}$	1.525	38.13
$2\frac{1}{2} \times 2 \times \frac{3}{16}$	.950	23.75	$\frac{5}{16}$	1.881	47.03
$\frac{1}{4}$	1.247	31.18	$\frac{3}{8}$	2.227	55.67
$\frac{5}{16}$	1.535	38.38	$4 \times 3 \times \frac{1}{4}$	1.970	49.25
$3 \times 2 \times \frac{3}{16}$	1.059	26.48	$\frac{5}{16}$	2.530	63.25
$\frac{1}{4}$	1.386	34.65	$\frac{3}{8}$	2.901	72.53
$\frac{3}{8}$	2.030	50.75			
TEES					
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$	.881	22.03	$3 \times 1\frac{1}{2} \times \frac{3}{16}$	.971	24.28
$2 \times 1\frac{1}{2} \times \frac{3}{16}$	.755	18.88	$3 \times 3 \times \frac{3}{8}$	2.693	67.33
$2 \times 2 \times \frac{1}{4}$	1.247	31.18	$4 \times \frac{5}{16}$	2.812	70.30
CHANNELS					
$3x.170$	1.406	35.15	$5x.225$	2.580	64.50
$.258$	1.713	42.83	$.325$	3.079	76.98
$4x.180$	1.832	45.80	$6x.314$	3.594	89.85
$.247$	2.139	53.48	$6x.375$	6.100	152.50
$.320$	2.475	61.88	$7x.230$	3.505	87.63
$5x.190$	2.296	57.40			
I BEAMS					
$3x.251$	2.250	56.25	$5x.210$	3.396	84.90
$.349$	2.564	64.10	$6x.344$	5.049	126.23
$4x.190$	2.614	65.35	$8x.270$	6.287	157.18
$.312$	4.235	105.88	$10x.310$	8.673	216.83
$.326$	3.247	81.18			

ALCOA ALUMINUM STRUCTURAL HANDBOOK — Write or call the Ducommun office nearest you for this valuable book on the use of aluminum shapes in the construction industry.

ALCOA ALUMINUM STRUCTURAL SHAPES

ALLOY 6061-T6 — Spec. MIL-A-25994

QQ-A-325b and (Ex) Extruded — Spec. QQ-A-270a-1

Standard 25 Foot Lengths

Dimensions Inches	Approx. Wt. Foot	Lbs. per Length	Dimensions Inches	Approx. Wt. Foot	Lbs. per Length
EQUAL ANGLES					
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$	.20	5.00	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	1.73	43.25
1 x 1 x $\frac{1}{8}$	.28	7.00	3 x 3 x $\frac{3}{16}$	1.28	32.00
$\frac{3}{16}$	.40	10.00	$\frac{1}{4}$	1.68	42.00
$\frac{1}{4}$	.51	12.75	$\frac{5}{16}$	2.08	52.00
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	.35	8.75	$\frac{3}{8}$	2.47	61.75
$\frac{3}{16}$	.51	12.75	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{4}$ (Ex)	1.99	49.75
$\frac{1}{4}$	.66	16.50	$\frac{5}{16}$ (Ex)	2.46	61.50
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$	.43	10.75	4 x 4 x $\frac{1}{4}$	2.28	57.00
$\frac{3}{16}$	.62	15.50	$\frac{5}{16}$	2.83	70.75
$\frac{1}{4}$	.81	20.25	$\frac{3}{8}$	3.38	84.50
$1\frac{3}{4} \times 1\frac{3}{4} \times \frac{1}{8}$	.51	12.75	$\frac{1}{2}$	4.41	110.25
$\frac{3}{16}$	.74	18.50	$\frac{3}{4}$	6.38	159.50
$\frac{1}{4}$	.96	24.00	5 x 5 x $\frac{1}{2}$ (Ex)	5.58	139.50
2 x 2 x $\frac{1}{8}$	.57	14.25	6 x 6 x $\frac{3}{4}$ (Ex)	5.12	128.00
$\frac{3}{16}$	.85	21.25	$\frac{1}{2}$ (Ex)	6.75	168.75
$\frac{1}{4}$	1.11	27.75	8 x 8 x $\frac{1}{2}$ (Ex)	9.14	228.50
$\frac{3}{8}$	1.59	39.75	1 (Ex)	17.67	441.75
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{16}$	1.07	26.75			
$\frac{1}{4}$	1.40	35.00			
UNEQUAL ANGLES					
$1\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{8}$	.38	9.50	$2\frac{1}{2} \times 2 \times \frac{1}{4}$	1.26	31.50
$\frac{3}{16}$	.57	14.25	$\frac{5}{16}$	1.55	38.75
$\frac{1}{4}$	.74	18.50	3 x 2 x $\frac{3}{16}$	1.07	26.75
$1\frac{3}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	.42	10.50	$\frac{1}{4}$	1.40	35.00
$\frac{3}{16}$	.62	15.50	$\frac{3}{8}$	2.05	51.25
$\frac{1}{4}$	.81	20.25	3 x 2 $\frac{1}{2} \times \frac{1}{4}$ (Ex)	1.54	38.50
2 x 1 $\frac{1}{2} \times \frac{1}{8}$	.50	12.50	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ (Ex)	1.68	42.00
$\frac{3}{16}$	.73	18.25	4 x 3 x $\frac{1}{4}$	1.99	49.75
$\frac{1}{4}$	.96	24.00	$\frac{3}{8}$	2.93	73.25
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$	1.11	27.75	6 x 3 $\frac{1}{2} \times \frac{1}{2}$ (Ex)	5.46	136.50
$2\frac{1}{2} \times 2 \times \frac{3}{16}$	.96	24.00			
TEES					
$1\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{4}$ (Ex)	.79	19.75	3 x 3 x $\frac{3}{8}$ (Ex)	2.72	68.00
2 x 2 x $\frac{1}{4}$ (Ex)	1.26	31.50	3 x 4 x $\frac{5}{16}$ (Ex)	2.84	71.00
CHANNELS					
3x.170 WEB	1.42	35.50	6x.200 WEB	2.83	70.75
.258 WEB	1.73	43.25	.225 WEB	3.00	75.00
.356 WEB	2.07	51.75	.314 WEB	3.63	90.75
4x.180 WEB	1.85	46.25	.437 WEB	4.48	112.00
.247 WEB	2.16	54.00	7x.230 WEB	3.54	88.50
.320 WEB	2.50	62.50	8x.250 WEB	4.25	106.25
† .318 WEB (Ex)	3.32	83.00	.487 WEB	6.48	162.00
5x.190 WEB	2.32	58.00	10x.526 WEB (Ex)	8.64	216.00
.325 WEB	3.11	77.75	12x.300 WEB	7.41	185.25
.472 WEB	3.97	99.25	15x.400 WEB (Ex)	11.71	292.75
I BEAMS					
3x.170 WEB	1.96	49.00	6x.230 WEB (Ex)	4.30	107.50
.349 WEB	2.59	64.75	.343 WEB (Ex)	5.10	127.50
4x.190 WEB	2.64	66.00	8x.270 WEB (Ex)	6.35	158.75
.326 WEB	3.28	82.00	10x.310 WEB (Ex)	8.75	219.00
5x.210 WEB (Ex)	3.43	85.75	12x.350 WEB (Ex)	10.99	274.75
.494 WEB (Ex)	5.10	127.50	.687 WEB (Ex)	17.28	432.00
H BEAMS					
4x.313 WEB (Ex)	4.76	119.00	8x.288 WEB	10.72	268.00
5x.313 WEB (Ex)	6.36	162.25	.313 WEB	11.24	281.00

†Shipbuilding Channel

NUMERICAL DIE NUMBER INDEX
ALCOA ALUMINUM EXTRUDED SHAPES
Alloys 6061 and 6062 — Spec. QQ-A-270a-1
Alloy 6063 — Spec. QQ-A-274

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ALCOA ALUMINUM EXTRUDED SHAPES

Alloys 6061 and 6062 — Spec. QQ-A-270a-1

Alloy 6063 — Spec. QQ-A-274

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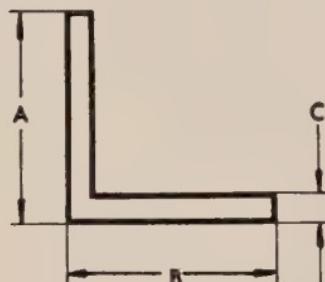
NUMERICAL DIE NUMBER INDEX (Cont.)**ALCOA ALUMINUM EXTRUDED SHAPES****Alloys 6061 and 6062 — Spec. QQ-A-270a-1****Alloy 6063 — Spec. QQ-A-274**

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19047	6063-T5	Threshold	16 $\frac{1}{4}$.829	66
19048	6063-T5	Threshold	16 $\frac{1}{4}$	1.102	66
19049	6063-T5	Threshold	16 $\frac{1}{4}$	1.226	66
20609	6063-T5	Handrail	20	.770	71
20609C	214	Channel (R. or L.H.)	71
20609S	214	Scroll (R. or L.H.)	71
22266	6063-T5	Channel	20	.360	59
22819	6063-T6	Channel	24	1.286	60
23787	6063-T5	Zee	16	.319	62
24531	6063-T6	Hat Section	24	.898	63

NUMERICAL DIE NUMBER INDEX (Cont.)**ALCOA ALUMINUM EXTRUDED SHAPES****Alloys 6061 and 6062 — Spec. QQ-A-270a-1****Alloy 6063 — Spec. QQ-A-274**

Die No.	Alloy	Shape	Length, Feet	Lbs. per Ft.	Page No.
25055	6063-T5	Tee	16	.281	61
26936	6063-T6	Snap Moulding	22	.064	66
26937	6063-T6	Snap Moulding	22	.040	66
37736	6063-T42	Window Sill	20	.636	72
37737	6063-T42	Window Sill	20	.691	72
39258	6063-T42	Joint Cover	....	....	69
39259	6063-T42	Gravel Stop	9' 11½"	.985	67
40517	6062-T6	Channel	22	.787	59
42058	6063-T42	Gravel Stop	9' 11½"	.845	67
42059	6063-T42	Gravel Stop	9' 11½"	.704	67
42061	6063-T42	Joint Cover	....	....	69
42062	6063-T42	Joint Cover	....	....	69
45876	6063-T6	Zee	24	.498	62
45877	6063-T6	Channel	16	.424	60
54380	5086-H112	Channel	25	1.738	60
54603	6063-T6	Roof Bow	16	.784	63
54684	6063-T42	Window Sill	20	.767	72
54685	6063-T42	Window Sill	20	.842	72
54686	6063-T42	Window Sill	20	.919	72
54687	6063-T42	Window Sill	21	.994	72
54688	6063-T42	Window Sill	21	1.067	72
54689	6063-T42	Window Sill	21	1.141	72
54691	6063-T42	Window Sill	21	1.716	72
54692	6063-T42	Window Sill	20	2.189	72
56250	6063-T6	Truck Flooring	35	2.136	70
64016	6063-T5	Fascia	16	1.060	..
66294E	6063-T5	Handrail	20	.716	71
66294	214	Terminal End	....	....	71
66588	6063-T42	Gravel Stop	9' 11½"	.938	67
66589	6063-T42	Joint Cover	....	....	69
66611	6063-T42	Coping	9' 10½"	2.412	68
68755	6063-T42	Gravel Stop	9' 11½"	1.606	67
69177	6063-T42	Coping	9' 10½"	3.695	69
70424	6063-T5	Moulding	16	.613	66
70426	6063-T5	Moulding	16	.186	66
79589	6063-T42	Fascia	9' 11½"	.313	68
79590	6063-T42	Soffit	9' 11½"	.444	68
79591	6063-T42	Gravel Stop	9' 11½"	1.122	68
79592	6063-T42	Gravel Stop	9' 11½"	1.129	68
79800	6063-T6	Truck Flooring	35	1.962	70
79801	6063-T6	Truck Flooring	35	1.830	70
84968	6063-T42	Gravel Stop	9' 11½"	1.331	67
84969	6063-T42	Joint Cover	....	....	69
87071	6063-T5	Channel	20	.374	59
87097	6063-T42	Gravel Stop	9' 11½"	.704	67
87098	6063-T42	Joint Cover	....	....	69
89603	6063-T6	Door Frame	18' 1"	.973	..
90503	6063-T5	Handrail	20	.980	71
90503E	214	Rail End	....	....	71

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)



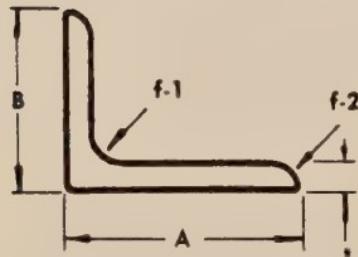
ANGLES FOR STRUCTURES

Equal and Unequal Legs

Sharp Corners

Alloy 6063-T5 — 16-Foot Lengths

Die Number	A Inches	B Inches	C Inches	Approx. Wt. Lbs. per Lin. Ft.	16 Ft.	Factor
1944	0.375	0.750	0.094	0.116	1.86	19
1312	0.500	0.500	0.062	0.070	1.12	28
79-H	0.500	0.500	0.125	0.131	2.10	15
1943	0.500	1.000	0.094	0.158	2.53	19
7201	0.500	1.000	0.125	0.206	3.30	15
895	0.500	1.250	0.125	0.244	3.90	14
79-O	0.625	0.625	0.125	0.168	2.69	15
472	0.750	0.750	0.062	0.108	1.73	28
79-A	0.750	0.750	0.125	0.206	3.30	14
7385	0.750	1.000	0.125	0.244	3.90	14
5137	0.750	1.500	0.125	0.319	5.10	14
7384	1.000	0.875	0.125	0.263	4.21	14
79-M	1.000	1.000	0.062	0.145	2.32	28
79-G	1.000	1.000	0.125	0.281	4.50	14
79-B	1.000	1.000	0.188	0.408	6.53	10
7613	1.000	1.500	0.125	0.356	5.70	14
6844	1.000	2.000	0.125	0.431	6.90	14
79-T	1.250	1.250	0.125	0.356	5.70	14
79-P	1.250	1.250	0.188	0.519	8.30	10
6746	1.250	3.500	0.125	0.694	11.10	14
10743	1.375	0.875	0.109	0.280	4.48	16
79-V	1.500	1.500	0.125	0.431	6.90	14
79-N	1.500	1.500	0.188	0.633	10.13	7
79-D	1.500	1.500	0.250	0.824	13.18	14
5706	1.625	0.625	0.125	0.319	5.10	9
79-Y	1.750	1.750	0.125	0.506	8.10	14
79-X	2.000	2.000	0.125	0.581	9.30	14
79-Q	2.000	2.000	0.188	0.857	13.71	9
79-E	2.000	2.000	0.250	1.124	17.98	7
2880	2.250	5.250	0.125	1.106	17.70	14



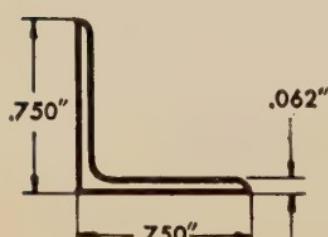
Unequal Legs

Rounded Inside Angle

Rounded Inside Corners

25-Foot Lengths

Die No.	A Inches	B Inches	t Inches	f1 Inches	f2 Inches	Approx. Wt. Lbs. per 25 Ft.	Factor
Alloy 6061-T6							
-1406	1.500	1.250	0.094	0.156	0.094	0.301	7.925
-2001	2.000	1.000	0.125	0.156	0.125	0.430	10.750
-2005	2.000	1.250	0.188	0.188	0.188	0.682	17.050
Alloy 6063-T5							
-2006	2.000	1.500	0.125	0.188	0.125	0.507	12.675
							13



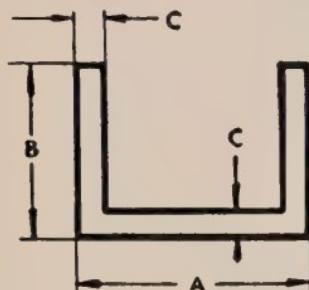
Die No. 78K

Alloy 6062-T6 — 22-Foot Lengths

APPROX. WT. PER FT. — .106 LBS.

FACTOR 27

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)
CHANNELS FOR STRUCTURES



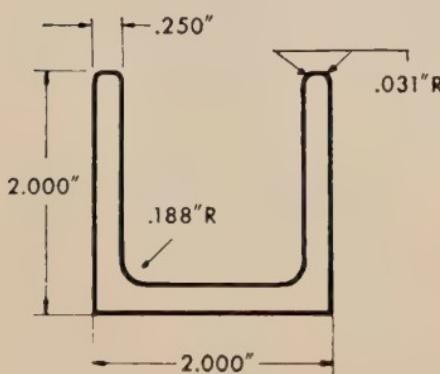
Sharp Corners

Alloy 6063-T5

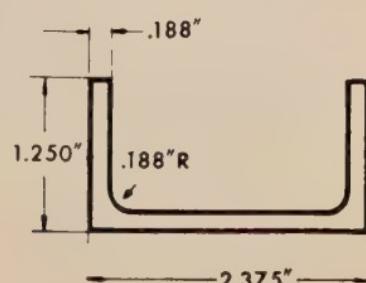
Die Number	A Inches	B Inches	C Inches	Lgth. Ft.	Approx. Lin. Ft.	Wt. Lbs. per Length	Factor
2335	0.500	0.375	0.125	16	0.150	2.40	15
2749	0.500	0.500	0.094	16	0.148	2.37	19
8997	0.500	0.750	0.125	16	0.263	4.21	14
4533	0.625	0.625	0.125	16	0.244	3.90	14
2715	0.750	0.375	0.125	16	0.187	2.99	15
3547	0.750	0.750	0.125	16	0.300	4.80	14
1940	1.000	0.500	0.125	20	0.263	5.26	14
7484	1.000	1.000	0.125	16	0.413	6.61	14
4286	1.250	0.500	0.125	20	0.300	6.00	14
87071	1.250	0.750	0.125	20	0.734	14.68	14
4542	1.250	1.250	0.125	16	0.526	8.42	14
4300	1.500	0.500	0.125	20	0.337	6.74	14
8449	1.750	0.500	0.125	16	0.374	5.98	14
2105	1.750	0.750	0.125	16	0.450	7.20	14
5714	1.750	1.000	0.125	16	0.524	8.38	14
2388	2.000	0.500	0.125	16	0.413	6.61	14
5527	2.000	1.000	0.125	20	0.564	11.28	14
22266	2.100	0.550	0.100	20	0.360	7.20	17
2748	2.250	0.875	0.125	16	0.563	9.01	14
6594	3.000	0.500	0.125	16	0.563	9.01	14
3776	3.000	1.000	0.125	16	0.713	11.41	14
17146	5.000	2.000	0.188	16	1.940	31.04	9

Alloy 6062-T6

40517	2.500	1.500	0.125	22	0.787	17.31	14
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Die No. 892

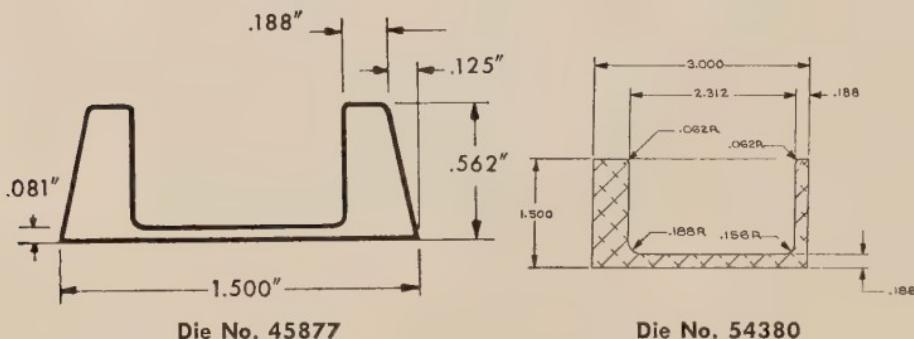
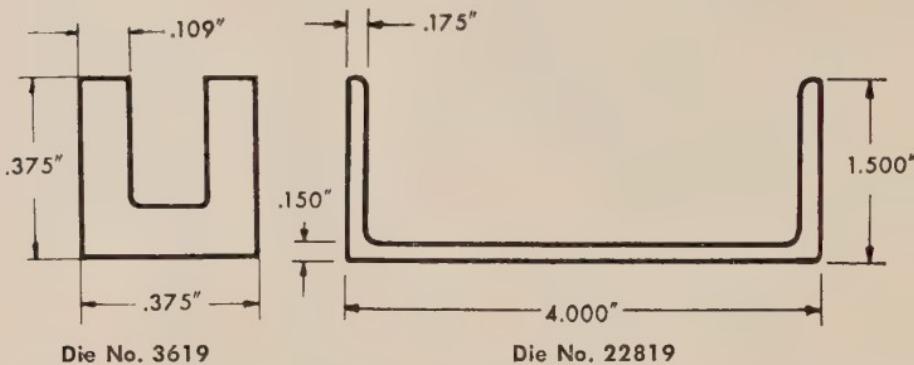


Die No. 2296

Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Lin. Ft.	Length	Factor
892	6063-T6	22	1.667	36.67	7
2296	6063-T6	24	1.031	24.74	9

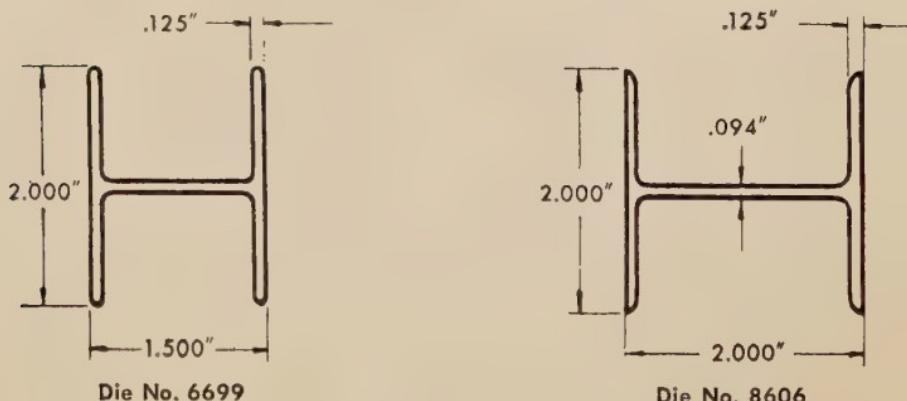
ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

CHANNELS FOR STRUCTURES



Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Length	Factor
3619	6063-T5	16	.120	17
22819	6063-T6	24	1.286	10
45877	6063-T6	16	.424	11
54380	5086-H112	25	1.738	..

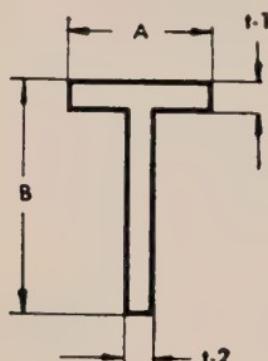
H BEAMS FOR STRUCTURES



Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Length	Factor
6699	6062-T6	24	.788	18.91
8606	6062-T6	22	.797	17.53

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

TEES FOR STRUCTURES



**Sharp Angles,
Sharp Corners**

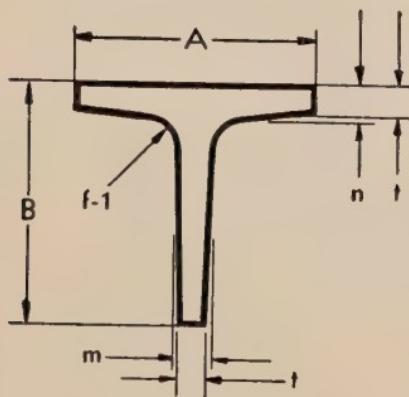
Die Number	A Inches	B Inches	t-1 Inches	t-2 Inches	Lgth. Ft.	Approx. Wt. Lbs. per Foot	Length	Factor
Alloy 6063-T5								
18307	.750	.750	.125	.125	16	.206	3.296	15
18308	1.000	.750	.125	.125	16	.244	3.904	14
25055	1.000	1.000	.125	.125	16	.281	4.496	14
5951	1.250	.875	.125	.125	16	.300	4.800	14
18906	2.000	.750	.125	.125	16	.394	6.304	14
Alloy 6061-T6								
1295	3.000	1.500	.088	.088	25	.971	24.275	9

Rounded Angles — Rounded Inside Corners

Alloy 6061-T6

10136-								
2006	2.000	1.250	.125	.125	18	.467	8.406	13

**Taper Stems and Flanges,
Rounded Angles,
Sharp Corners**

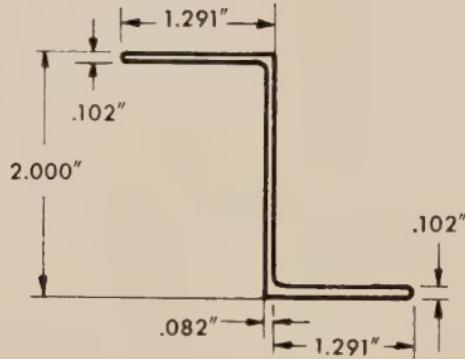
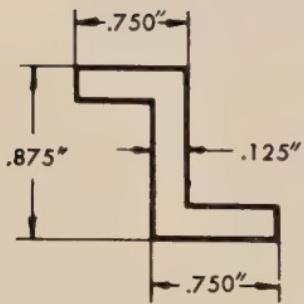
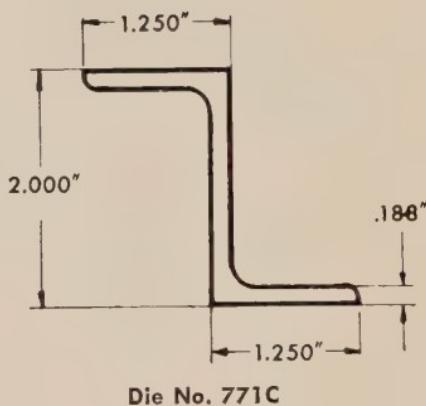
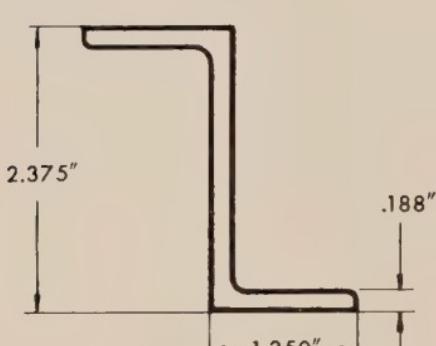


Die No. 853

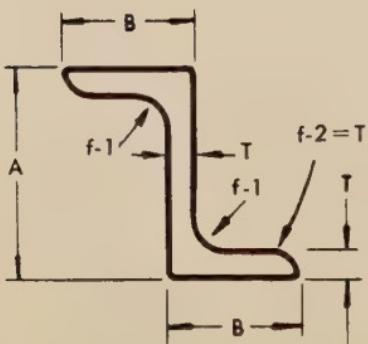
Die No.	A Inches	B Inches	t Inch.	n Inch.	m Inch.	f-1 Inch.	Lgth. Ft.	Approx. Wt. Lbs. per Ft. Lgth.	Factor
Alloy 6062-T6									
853-F	1.000	1.000	.125	.156	.312	.125	22	.320	7.040
853-B	1.500	1.250	.125	.156	.156	.125	22	.450	9.900
853-N	1.500	1.250	.188	.219	.219	.125	22	.628	13.816
853-K	1.500	1.500	.188	.219	.219	.125	22	.700	15.400
853-G	1.500	1.500	.250	.281	.281	.188	22	.890	19.580
Alloy 6061-T6									
853-D	3.000	3.000	.375	.438	.438	.312	25	2.790	69.750
Alloy 6061-T4									
853-E	4.000	4.000	.375	.438	.438	.500	15	.385	57.750

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

ZEES FOR STRUCTURES



Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Foot	Length	Factor
771-C	6062-T6	22	.938	20.64	9
7088	6062-T6	22	1.022	22.48	9
23787	6063-T5	16	.319	5.10	14
45876	6062-T6	24	.498	11.95	18

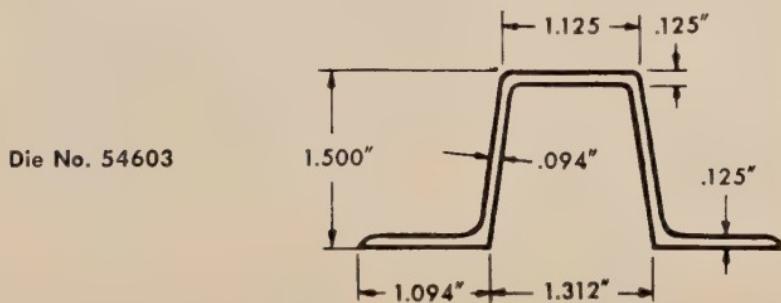
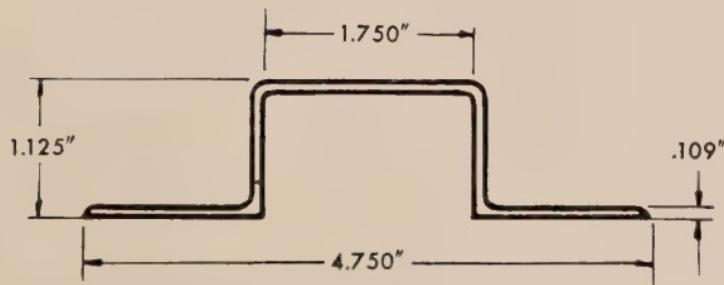
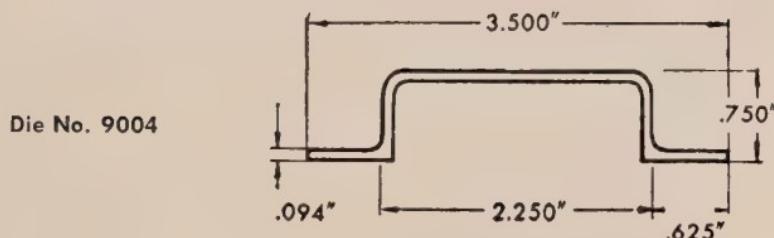
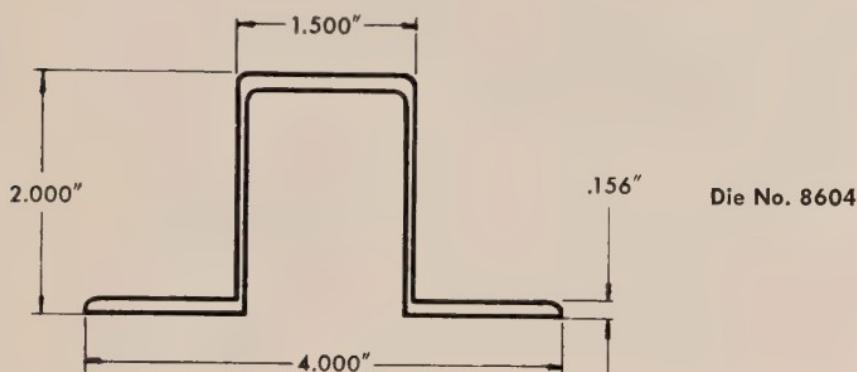


**Equal Legs,
Rounded Inside Angles,
Rounded Inside Corners**

Alloy 6061-T6

Section Number	A Inch	B Inch	T Inch	f-1 Inch	Lgth. Ft.	Approx. Wt. Lbs. per Ft.	Lgth.	Factor
10138-0503	.625	.750	.050	.094	25	.125	3.125	32

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)
HAT SECTIONS FOR STRUCTURES

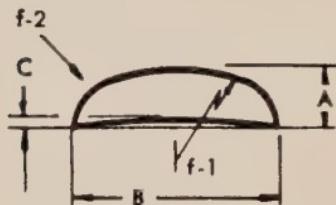


Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Foot	Length	Factor
8604	6062-T6	22	1.163	25.59	13
9004	6063-T6	24	.533	12.79	17
24531	6062-T6	24	.898	21.55	15
54603	6063-T6	16	.784	12.54	15

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

FOR TRIM

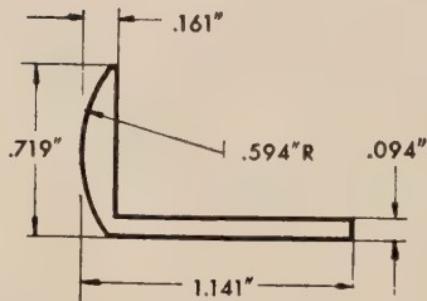
16 FT. LG.



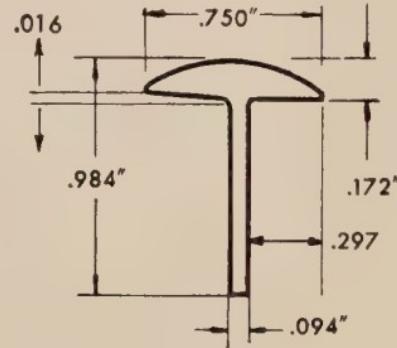
Die No. 74

Alloy 6063-T42

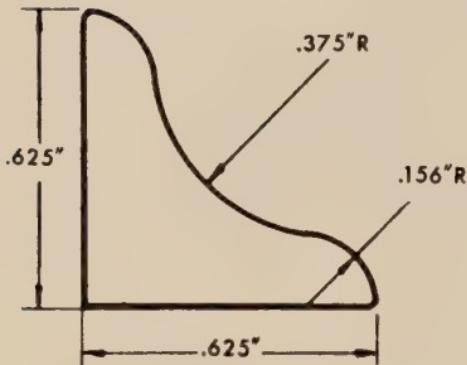
Die Number	A	B	C	f1	f2	Length Feet	Approx. Wt. Lbs. per Lin. Ft.	Lgth.	Factor
74-A	.188	.625	.019	.625	.188	16	.107	1.71	14
74-B	.188	.750	.020	.750	.188	16	.128	2.05	13
74-C	.188	.500	.019	.500	.188	16	.086	1.38	14
74-D	.250	1.000	.025	1.250	.203	16	.228	3.65	10
74-E	.250	.875	.025	.875	.250	16	.192	3.07	10
74-F	.250	1.250	.025	1.250	.250	16	.257	4.11	10



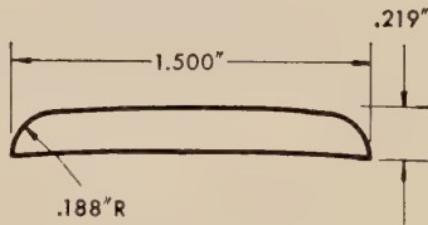
Die No. 10



Die No. 63



Die No. 251

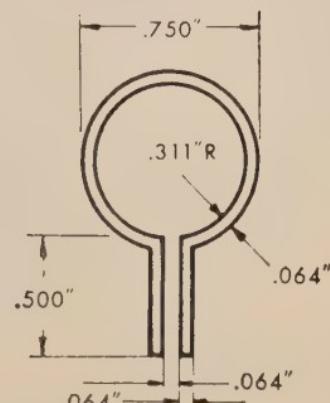
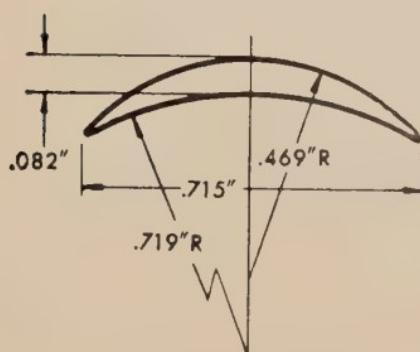
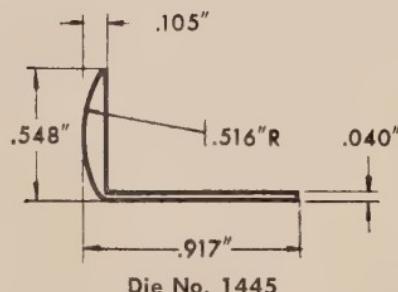
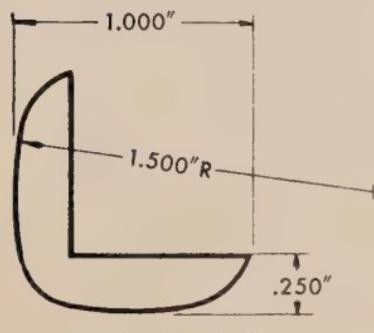
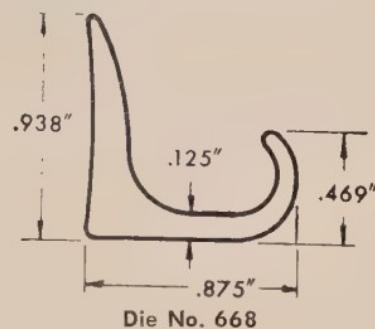
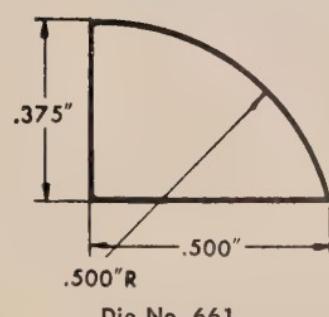
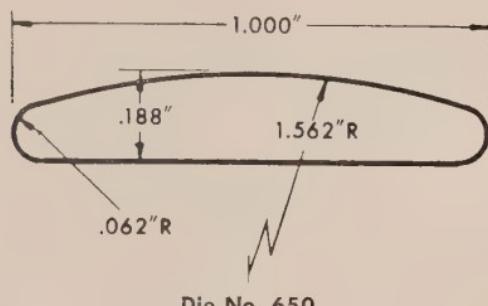
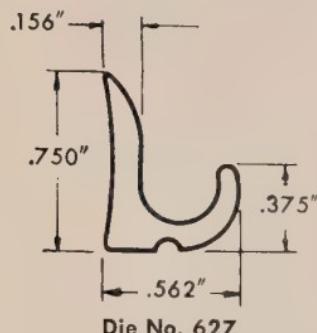


Die No. 363

Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Lin. Ft.	Length	Factor
10	6063-T42	16	.206	3.30	17
63	6063-T42	16	.188	3.01	16
251	6063-T42	16	.228	3.65	10
363	6063-T42	16	.356	5.70	9
6B	6063-T4	18' 1"	.339	6.13	11

ALCOA ALUMINUM AND ITS ALLOYS — Write or phone the Ducommun office nearest you and this interesting, detailed booklet, giving the properties of each alloy, will be forwarded to you at no cost.

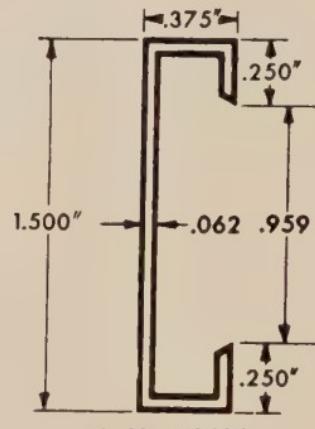
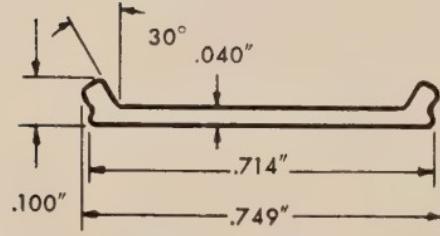
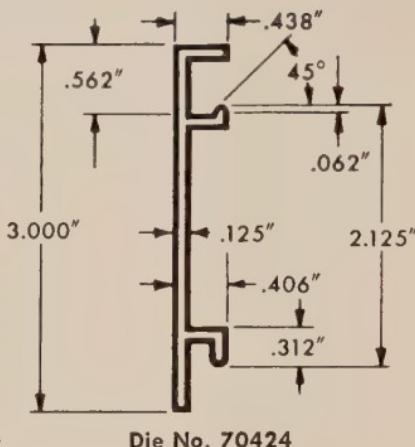
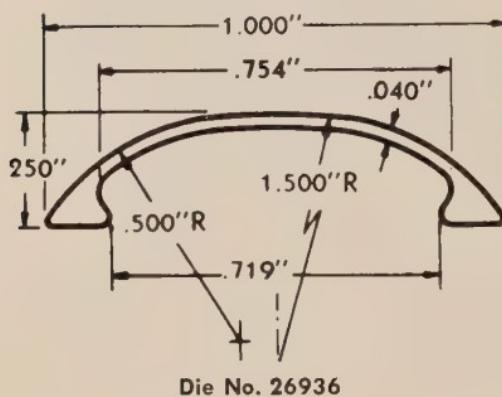
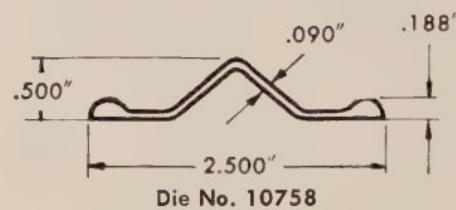
ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.) FOR TRIM



Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Length	Factor
627	6063-T42	16	.184	2.94
650	6063-T42	16	.191	3.06
661	6063-T42	16	.168	2.69
668	6063-T42	16	.307	4.91
787	6063-T42	16	.433	6.93
1445	6063-T42	16	.093	1.49
1843	6063-T42	16	.058	.93
4477	6063-T5	16	.228	3.65

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

FOR TRIM



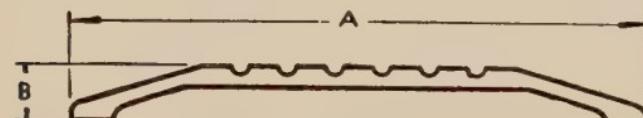
Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Lin. Ft.	Factor
10758	6062-T6	22	.369	8.12
26936	6063-T6	22	.064	1.41
26937	6063-T6	22	.040	.88
70424	6063-T5	16	.613	9.81
70426	6063-T5	16	.186	2.98

No. SC-202 SNAP-ON CLIPS

Used for installing Alcoa Aluminum Trim,

Die No.'s 70426 illustrated above, 70425 and 84702.

FOR THRESHOLDS

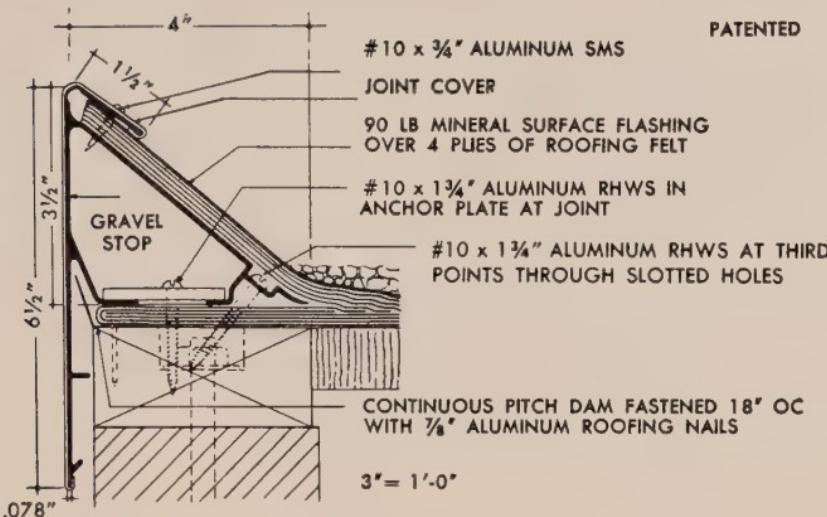


Alloy 6063-T5 — 16 Foot, 3 Inch Lengths

Die Number	Dimensions, Dec. Inch		Approx. Wt. Lbs. per Lin. Ft.	Factor
	A	B		
19047	4.000	.500	.829	13.47
19048	5.000	.500	1.102	17.91
19049	6.000	.500	1.226	19.92

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

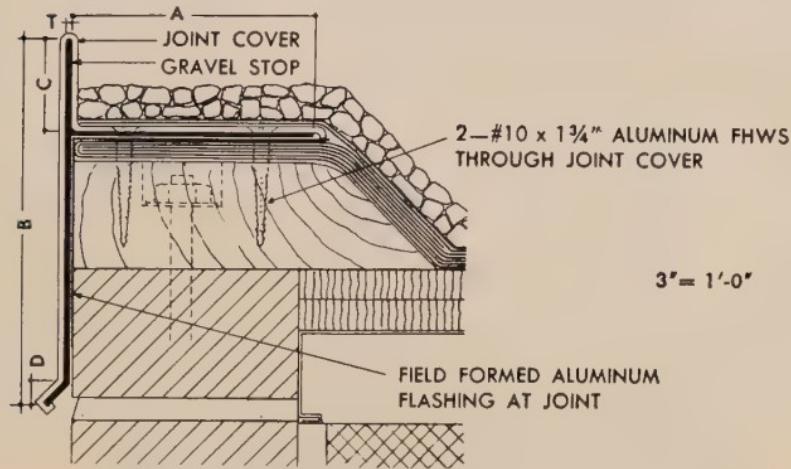
GRAVEL STOPS



Type E

Alloy 6063-T42

Die Number	Length	Approx. Wt. Lbs. per Length
68755	9' 11 1/2"	1.606



Type F

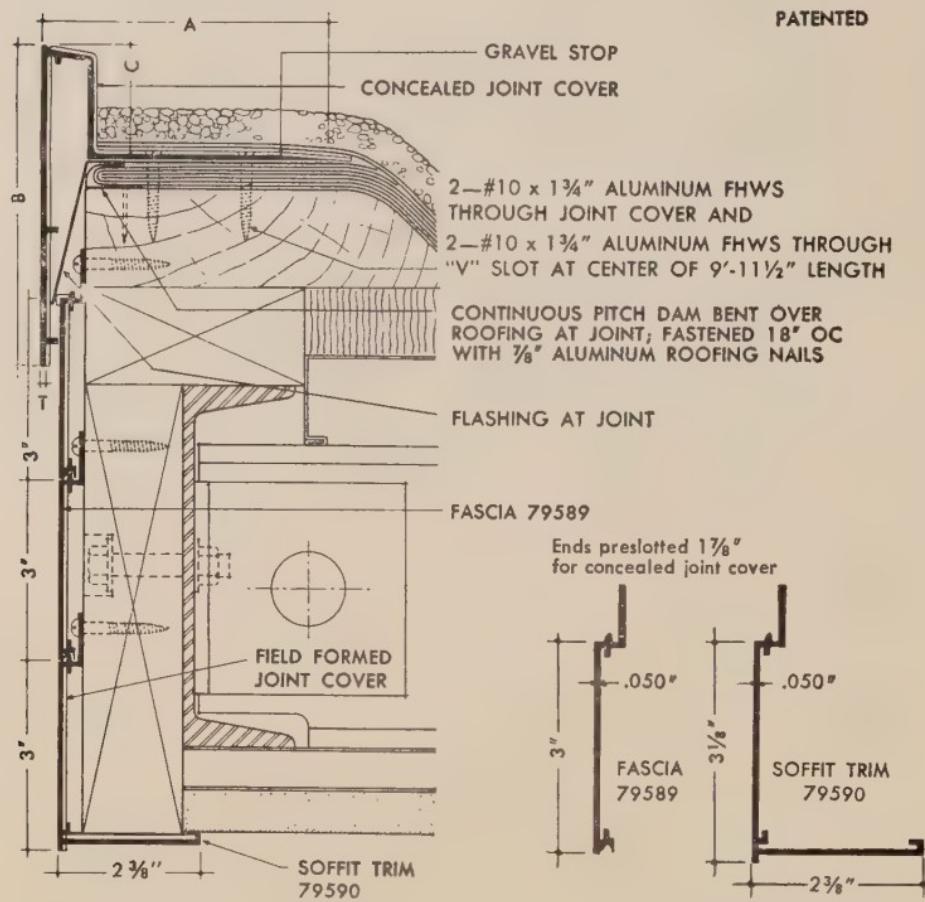
Alloy 6063-T42

Lengths — 9 Feet, 11 1/2 Inches

Die Number	A	B	C	D	T	Approx. Wt. Lbs. per Foot	Length
42059	4	3 1/2	5/8	1/4	5/64	.704	9.65
87097	4	3 1/2	1	1/4	5/64	.704	9.65
42058	4	5	1	1/4	5/64	.845	11.58
66588	4	6	1 1/2	1/4	5/64	.938	12.86
39259	4	6 1/2	3/4	1/4	5/64	.985	13.50
84968	4	7 3/4	1 1/2	1/4	5/32	1.331	18.25

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

GRAVEL STOPS — FASCIA — SOFFIT TRIM



Type FF

Alloy 6063-T42

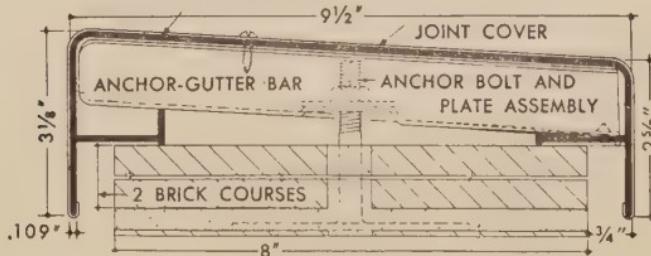
Lengths — 9 Feet, 11 1/2 Inches

Die Number	Shape	A	B	C	Dimensions, Inches	T	Approx. Wt. Lbs. per Foot	Length
79591	Gravel Stop	4 3/4	4 5/16	3/4		3/32	1.122	11.17
79592	Gravel Stop	4 3/4	5 5/16	1 1/4		5/64	1.129	11.24
79589	Fascia	(See Drawing)					.313	3.12
79590	Soffit Trim	(See Drawing)					.444	4.42

COPINGS

COPING 66611

PATENTED



Type G-8 (8" Wall)

Alloy 6063-T42

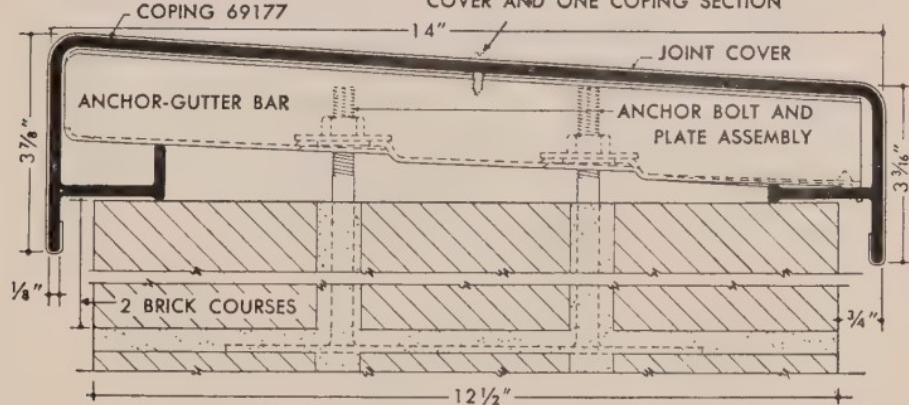
Lengths — 9 Feet, 10 1/2 Inches — Weight, Lbs.: Foot, 2.412; Length, 23.82

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

COPINGS

3" = 1'-0"

10 x $\frac{3}{4}$ " ALUMINUM SMS THROUGH JOINT COVER AND ONE COPING SECTION



Type G-12

Alloy 6063-T42

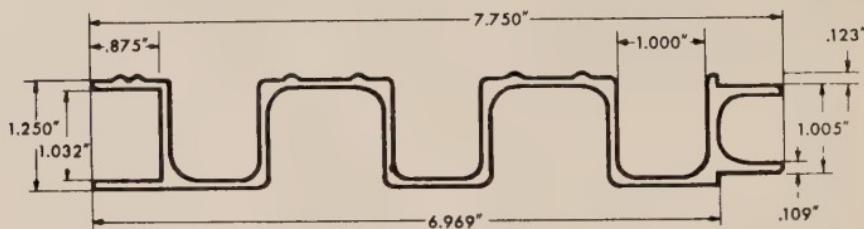
Lengths — 9 Feet, 10 1/2 Inches — Weight, Lbs.: Foot, 3.695; Length, 36.47

ACCESSORIES FOR GRAVEL STOPS AND COPINGS

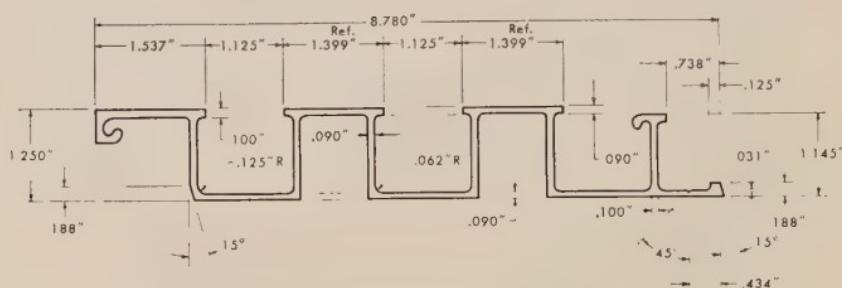
Die Number	Shape	Alloy	No. In Ctn.	Wt. Lbs., Each	For Use with Die No.
39258	Joint Cover	6063-T42	25	0.56	39259
15093	Inside Corner	6063-T42	6	2.83	39259
15092	Outside Corner	6063-T42	6	2.83	39259
42061	Joint Cover	6063-T42	25	0.50	42058
15087	Inside Corner	6063-T42	6	2.43	42058
15096	Outside Corner	6063-T42	6	2.43	42058
42062	Joint Cover	6063-T42	25	0.41	42059
15089	Inside Corner	6063-T42	6	1.99	42059
15098	Outside Corner	6063-T42	6	1.99	42059
15091	Inside Corner	6063-T42	6	3.84	42063
15090	Outside Corner	6063-T42	6	3.84	42063
66589	Joint Cover	6063-T42	25	0.57	66588
15095	Inside Corner	6063-T42	6	2.70	66588
15094	Outside Corner	6063-T42	6	2.70	66588
15022	Joint Cover	3003-O	25	0.20	66611
15064	Inside Corner	6063-T42	6	4.80	66611
15065	Outside Corner	6063-T42	6	4.80	66611
15108	Anchor Plate	.....	48	1.50	66611
15040	Gutter Bar	5052-H34	50	0.40	66611
15045	Joint Cover	3003-O	25	0.11	68755
15020	Inside Corner	6063-T42	6	3.80	68755
15021	Outside Corner	6063-T42	6	3.80	68755
15088	Anchor Plate	3003-H18	100	0.15	68755
15023	Joint Cover	3003-O	25	0.28	69177
15066	Inside Corner	6063-T42	6	11.40	69177
15067	Outside Corner	6063-T42	6	11.40	69177
15112	Anchor Plate	.....	24	3.00	69177
15038	Gutter Bar	5052-H34	50	0.72	69177
15354	Joint Cover	3003-H14	25	0.19	79587-88
15391	Outside Corner	6063-T42	6	5.25	79587-88
15355	Anchor Plate	3003-H18	100	0.13	79587-88
15358	Joint Cover	3003-H14	25	0.36	79591
15356	Inside Corner	6063-T42	6	2.64	79591
15357	Outside Corner	6063-T42	6	3.16	79591
15361	Joint Cover	3003-H14	25	0.36	79592
84969	Joint Cover	6063-T42	25	0.79	84968
15484	Inside Corner	6063-T42	6	3.84	84968
15485	Outside Corner	6063-T42	6	3.84	84968
87098	Joint Cover	6063-T42	25	0.43	87097
15480	Inside Corner	6063-T42	6	1.99	87097
15481	Outside Corner	6063-T42	6	1.99	87097

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

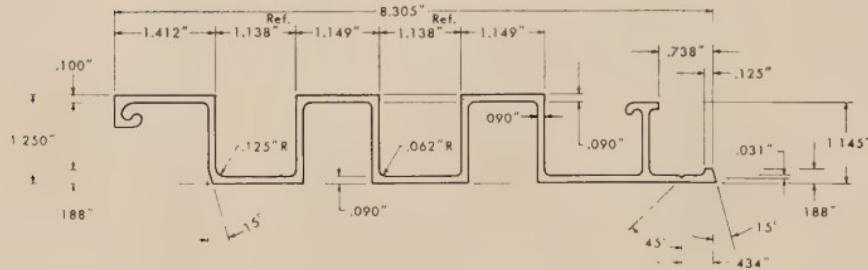
FLOORING FOR TRUCK BODIES



Die No. 56250



Die No. 79800



Die No. 79801

Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Length Lin. Ft.	Factor
56250	6063-T6	35	2.136	74.76
79800	6063-T6	35	1.962	68.67
79801	6063-T6	35	1.830	64.05

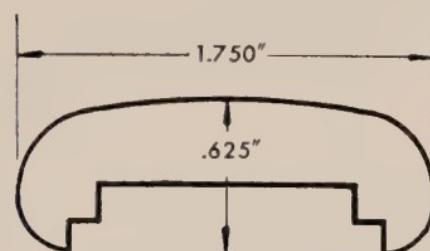
COMPLETE NUMERICAL INDEX

of all Alcoa Aluminum Die Numbers in our stock
will be found on pages 54 to 57.

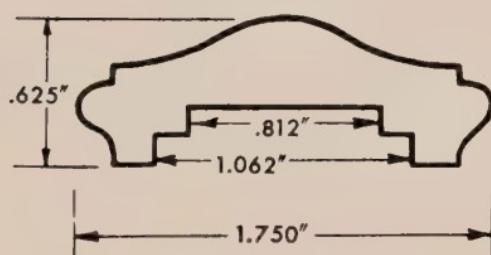
ENGINEERING DETAILS

We can furnish complete engineering information
on all Aluminum Shapes listed in this book.

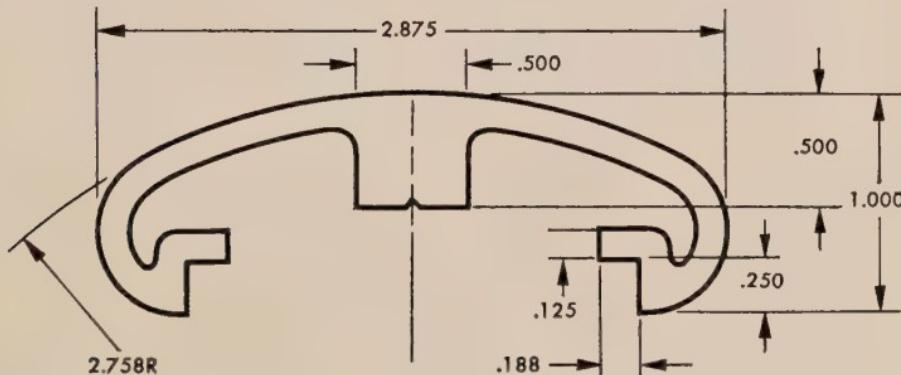
ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)
RAILINGS FOR HANDRAILS



Die No. 20609



Die No. 66294



Die No. 90503

Die Number	Alloy	Length Feet	Approx. Wt. Lbs. per Foot	Factor
20609	6063-T5	20	.770	16.17
66294	6063-T5	20	.716	15.04
90503	6063-T5	20	.980	19.60

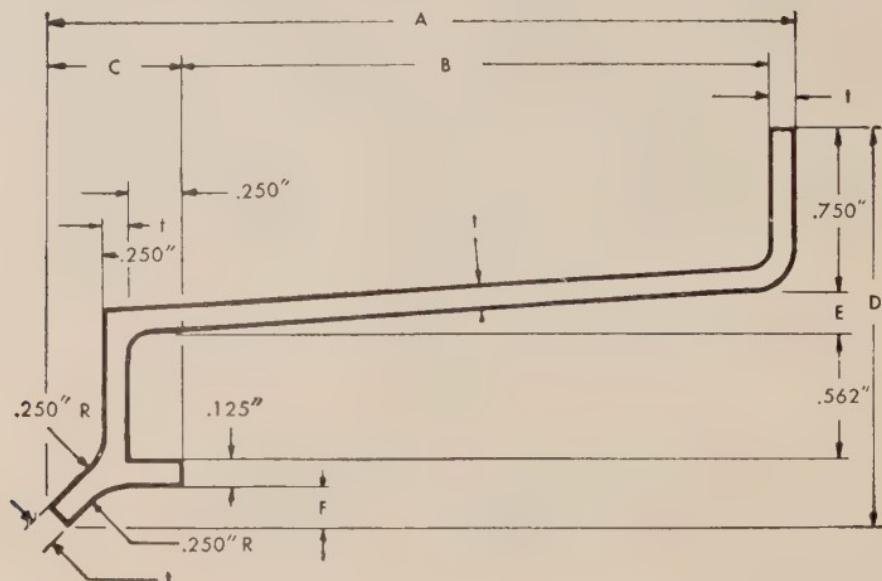
HANDRAIL ACCESSORIES

Alloy 214 Sand Castings

Die Number	Shape	Wt. Lbs. Each	For Use with Die No.
303-B	Wall Bracket	0.50	90503
90503-E	Terminal End	2.55	90503
16505-S	L or R. Scroll	1.30	90503
16505-C	L or R. Channel	0.60	90503
301-B	Wall Bracket	0.67	66294
66294-E	Terminal End	0.66	66294
20609-S	L or R. Scroll	0.80	20609
20609-C	L or R. Channel	0.26	20609

ALCOA ALUMINUM EXTRUDED SHAPES, (Cont.)

FOR WINDOW SILLS



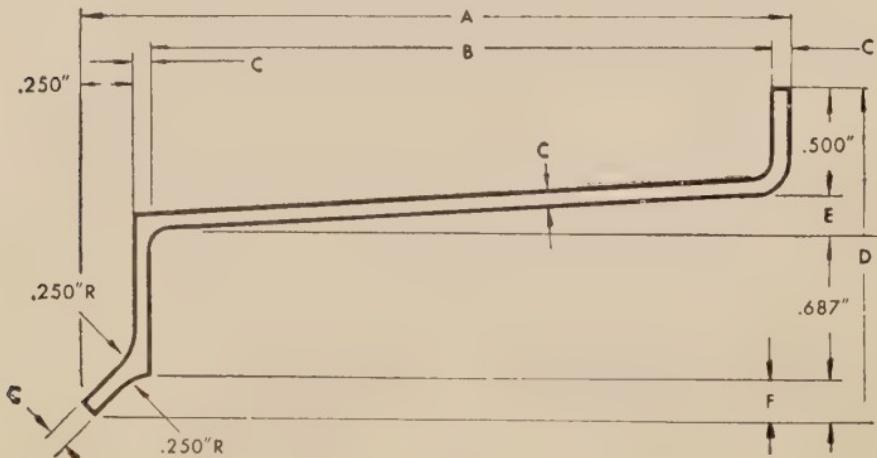
Type AA

Alloy 6063-T42

Section Number	A Inches	B Inches	C Inch	D Inches	E Inch	F Inch	t Inch	Lgth. Ft.	Approx. Wt. Lbs. per Ft.	Factor
54684	3.500	2.750	.625	1.812	.188	.188	.125	20	.767	13
54685	4.000	3.250	.625	1.844	.219	.188	.125	20	.842	13
54686	4.500	3.750	.625	1.875	.250	.188	.125	20	.919	13
54687	5.000	4.250	.625	1.906	.281	.188	.125	21	.994	13
54688	5.500	4.750	.625	1.936	.312	.188	.125	21	1.067	13
54689	6.000	5.250	.625	1.969	.344	.188	.125	21	1.141	13
54691	7.562	6.750	.625	2.062	.438	.188	.156	21	1.716	11
54692	8.125	7.250	.688	2.156	.469	.250	.188	20	2.189	9

No. SA-100 ANCHOR CLIPS

Used to anchor Alcoa Window Sills Nos. 54684 thru 54693



Type C

Alloy 6063-T42

Section Number	A Inches	B Inches	C Inch	D Inches	E Inch	F Inch	Lgth. Ft.	Approx. Wt. Lbs. per Ft.	Factor
37736	4.437	4.000	.094	1.625	.250	.188	20	.636	18
37737	4.937	4.500	.094	1.656	.281	.188	20	.691	18

ALCOA ALUMINUM TUBES

Alloy 2024-T3 Round Drawn (D) Tubes

Spec. WW-T-785b-1 Type 1, Condition T

Alloy 2024-T4 Round Extruded (E) Tubes

Spec. QQ-A-267 Condition T

AN Identified — Standard 12 Foot Lengths

O.D. Inches	Wall Thickness Inch	Approx. Wt. Lbs. per Foot	Approx. Length	O.D. Inches	Wall Thickness Inch	Approx. Wt. Lbs. per Foot	Approx. Length
3/16..	.035 D..20..	.020..	.240	1 1/2 ..	.065 D..16..	.352..	4.224
1/4 ..	.028 D..22..	.024..	.288		.083 D..14..	.444..	5.324
	.035 D..20..	.028..	.336		.120 D..11..	.622..	7.464
	.049 D..18..	.037..	.444		.250 D..1/4"	1.173..	14.076
5/16 ..	.035 D..20..	.037..	.444	1 5/8 ..	.065 D..16..	.383..	4.590
	.049 D..18..	.049..	.588	1 3/4 ..	.049 D..18..	.314..	3.770
3/8 ..	.035 D..20..	.045..	.540		.058 D..17..	.370..	4.444
	.049 D..18..	.060..	.720		.065 D..16..	.413..	4.957
	.058 D..17..	.069..	.833		.083 D..14..	.520..	6.240
	.065 D..16..	.076..	.912		.120 D..11..	.734..	8.808
7/16 ..	.049 D..18..	.071..	.857	2 ..	.049 D..18..	.360..	4.321
	.065 D..16..	.091..	1.090		.065 D..16..	.474..	5.688
1/2 ..	.035 D..20..	.061..	.732		.083 D..14..	.062..	7.224
	.049 D..18..	.084..	1.000		.120 D..11..	.847..	10.164
	.058 D..17..	.097..	1.163		.250 D..1/4"	1.652..	19.824
	.065 D..16..	.106..	1.273				
5/8 ..	.028 D..22..	.063..	.756	2 1/4 ..	.065 D..16..	.530..	6.360
	.035 D..20..	.078..	.936		.083 D..14..	.673..	8.076
	.049 D..18..	.106..	1.272		.250 D..1/4"	1.887..	22.644
	.058 D..17..	.123..	1.476	2 1/2 ..	.065 D..16..	.592..	7.100
	.065 D..16..	.137..	1.644		.120 D..11..	1.081..	12.972
3/4 ..	.035 D..20..	.094..	1.128		.250 E..1/4"	2.122..	25.464
	.049 D..18..	.130..	1.560		.500 E..1/2"	3.764..	45.168
	.058 D..17..	.151..	1.812	2 3/4 ..	.250 D..1/4"	2.356..	28.272
	.065 D..16..	.168..	2.020		.500 E..1/2"	4.243..	50.916
	.083 D..14..	.209..	2.509	3 ..	.083 D..14..	.908..	10.896
7/8 ..	.049 D..18..	.153..	1.846		.120 D..11..	1.306..	15.672
	.058 D..17..	.179..	2.142		.250 E..1/4"	2.591..	31.092
	.065 D..16..	.198..	2.376		.500 E..1/2"	4.712..	56.544
1 ..	.035 D..20..	.128..	1.536	3 1/2 ..	.250 M..1/4"	3.06 ..	36.72
	.049 D..18..	.175..	2.100		.500 M..1/2"	5.65 ..	67.32
	.058 D..17..	.206..	2.472	4 ..	.250 E..1/4"	3.53 ..	42.36
	.065 D..16..	.230..	2.760		.500 M..1/2"	6.60 ..	79.20
	.083 D..14..	.287..	3.439	4 1/2 ..	.250 E..1/4"	4.01 ..	48.11
	.095 D..13..	.324..	3.890		.500 M..1/2"	7.54 ..	90.48
	.156 D..5/32"	.496..	5.952		.750 M..3/4"	10.60 ..	127.20
1 1/8 ..	.049 D..18..	.199..	2.388	5 ..	.250 E..1/4"	4.48 ..	53.76
	.065 D..16..	.260..	3.120		.500 M..1/2"	8.48 ..	101.76
1 1/4 ..	.035 D..20..	.160..	1.921		1.000 E..1..	15.08 ..	180.96
	.049 D..18..	.221..	2.652	5 1/2 ..	.250 E..1/4"	4.95 ..	59.40
	.058 D..17..	.260..	3.121		.500 E..1/2"	9.43 ..	113.16
	.065 D..16..	.291..	3.492		1.000 E..1..	16.96 ..	203.52
	.083 D..14..	.365..	4.382	6 ..	.250 E..1/4"	5.42 ..	65.04
1 1/2 ..	.035 D..20..	.193..	2.316		.500 M..1/2"	10.36 ..	124.32
	.049 D..18..	.268..	3.216		1.000 E..1..	18.84 ..	226.03

M — Mechanical Tube — Only Difference from Extruded Tube is Closer Tolerance.

ALCOA ALUMINUM TUBES**Alloy 3003-H14 Round Drawn Tubes****Spec. WW-T-788c-1****Identified — 12 Foot Lengths**

O.D. Inches	Wall Thickness				Approx.		O.D. Inches	Wall Thickness				Approx.		
	Dec. Inch	Stubs' Gage	Wt. Foot	Lbs. per Length	Dec. Inch	Stubs' Gage		Dec. Inch	Stubs' Gage	Wt. Foot	Lbs. per Length	Dec. Inch	Stubs' Gage	
3/16	.022	24	.014	.168	1	.049	18	.174	2.09					
1/4	.022	24	.019	.228		.058	17	.204	2.45					
	.035	20	.028	.336		.065	16	.226	2.71					
5/8	.022	24	.029	.348	1 1/4	.022	24	.101	1.21					
	.028	22	.036	.432		.035	20	.159	1.91					
	.035	20	.044	.528		.049	18	.219	2.63					
1/2	.028	22	.049	.588		.058	17	.259	3.11					
	.035	20	.061	.732	1 3/8	.058	17	.285	3.42					
	.049	18	.083	.996	1 1/2	.035	20	.191	2.29					
	.065	16	.105	1.260		.049	18	.266	3.19					
5/8	.028	22	.063	.756		.058	17	.312	3.74					
	.035	20	.077	.924		.065	16	.347	4.16					
	.049	18	.105	1.260	1 3/4	.035	20	.224	2.69					
	.065	16	.135	1.620		.049	18	.311	3.73					
3/4	.022	24	.064	.768		.065	16	.408	4.90					
	.035	20	.093	1.12	2	.035	20	.257	3.08					
	.049	18	.128	1.54		.049	18	.357	4.28					
	.058	17	.149	1.79		.065	16	.469	5.63					
	.065	16	.166	1.99	2 1/2	.035	20	.322	3.86					
7/8	.035	20	.110	1.32		.049	18	.447	5.36					
	.049	18	.150	1.80		.065	16	.586	7.03					
	.058	17	.177	2.12	3	.065	16	.707	8.48					
	.065	16	.196	2.35		5 1/2†	.051	1.037	31.11					
1	.035	20	.126	1.51										

Alloy 5050-0 Coiled "Utilitube"

Used for fuel and lubricating lines for engines and heaters; for vacuum and hydraulic lines for brakes and instruments; for cutting compounds on machine tools, for refrigerants with the exception of Methylchloride.

Has good flaring and forming characteristics and work hardens less under repeated bending than soft copper. Has high corrosion resistance including industrial and seacoast atmospheres. Utilitube has excellent resistance to vibration. Mechanical properties improve at sub-zero temperatures, even as low as minus 320 degrees Fahrenheit.

O.D. Inch	Feet per Coil				Wall Thickness		O.D. Inch	Feet per Coil				Wall Thickness		
	Dec. Inch	Thickness In.	Approx. Lbs. per Coil	Dec. Inch	Thickness In.	Approx. Lbs. per Coil		Dec. Inch	Thickness In.	Approx. Lbs. per Coil	Dec. Inch	Thickness In.		
1/8	50	.025	.46	1/2	.50	.049	4.04							
3/16	50	.028	.83	5/8	.50	.049	5.20							
1/4	50	.032	1.29	3/4	.50	.058	7.40							
5/16	50	.035	1.79	3/4	100	.058	14.80							
3/8	50	.035	2.19											

Alloy 5052-0 Soft Round Drawn Tubes**Spec. WW-T-787b-1****AN Identified — 12 Foot Lengths**

O.D. Inch	Wall Thickness				Approx.		O.D. Inch	Wall Thickness				Approx.		
	Dec. Inch	Stubs' Gage	Wt. Foot	Lbs. per Length	Dec. Inch	Stubs' Gage		Dec. Inch	Stubs' Gage	Wt. Foot	Lbs. per Length	Dec. Inch	Stubs' Gage	
1/8	.035	20	.0115	.138	5/8	.035	20	.0430	.516					
3/16	.035	20	.0193	.232		.049	18	.0578	.694					
1/4	.028	22	.0228	.274	1/2	.028	22	.0478	.574					
	.035	20	.0272	.326		.035	20	.0588	.706					
	.049	18	.0357	.428		.049	18	.0804	.965					
5/16	.035	20	.0351	.421		.065	16	.1019	1.223					

†Stock Lengths 30 Foot

(Continued on Page 75)

ALCOA ALUMINUM TUBES

Alloy 5052-O Soft Round Drawn Tubes (Cont.)

Spec. WW-T-787b-1

AN Identified — 12 Foot Lengths

O.D. Inches	Wall Thickness			Approx.		O.D. Inches	Wall Thickness			Approx.	
	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot
5/8	.028	.22	.0606	.727	1 1/2	.035	.20	.1852	2.222		
	.035	.20	.0745	.894		.049	.18	.2580	3.096		
	.042	.19	.0891	1.069		.065	.16	.3381	4.057		
	.049	.18	.1020	1.224	1 3/4	.049	.18	.3020	3.624		
	.065	.16	.1313	1.576	2	.035	.20	.2525	3.018		
3/4	.035	.20	.0920	1.104		.049	.18	.3460	4.152		
	.049	.18	.1240	1.488		.065	.16	.4557	5.348		
	.065	.16	.1617	1.940	2 1/2	.035	.20	.3158	3.790		
1	.028	.22	.1010	1.210		.049	.18	.4400	5.280		
	.035	.20	.1230	1.476		.065	.16	.5733	6.880		
	.049	.18	.1780	2.136	3	.035	.20	.383	4.60		
	.065	.16	.2205	2.646		.049	.18	.525	6.30		
1 1/4	.035	.20	.1554	1.865		3 1/2	.049	.18	.614	7.37	
	.049	.18	.2130	2.556							

Alloy 5086-H32 Round Drawn Tubes

Spec. MIL-T-21494-1

Inches	Wall Thickness		ASA Pipe Sizes	Schedule	Length Feet	Approx.		Wt. Lbs. per Foot	Length
	Dec. In.	in.				Thickness	Dec.		
.675	.091		3/8	40	20	.192		3.840	
.840	.109		1/2	40	20	.288		5.766	
1.000	.125		—	—	12	.382		4.584	
1.660	.140		1 1/4	40	20	.770		15.400	
1.900	.145		1 1/2	40	20	.921		18.42	
2.250	.125		—	—	10	.980		9.80	
2.375	.154		2	40	20	1.239		24.78	
	.218		2	80	20	1.702		34.04	
2.875	.203		2 1/2	40	20	1.964		39.28	
	.276		2 1/2	80	20	2.597		51.94	
4.000	.226		3 1/2	40	20	3.088		61.76	
4.500	.375		—	—	21	5.710		119.91	
6.000	.250		—	—	12	5.204		62.45	
	.375		—	—	16	7.790		124.64	
8.000	.375		—	—	16	10.349		165.58	
9.000	.250		—	—	24' 1/2"	7.918		190.36	
	.375		—	—	16	11.711		187.38	
10.750	.375		—	—	20	14.087		281.74	

Alloy 6061-O Round Drawn Tubes

Spec. WW-T-789b-1

Unoiled and Unmarked — 12 Foot Lengths

O.D. Inches	Wall Thickness			Approx.		O.D. Inches	Wall Thickness			Approx.	
	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot
3/4	.020	.25	.054	.65	1 1/2	.020	.25	.094	1.13		
1 1/4	.020	.25	.091	1.09							

Alloy 6061-T6 Round Hydraulic Tubes

Spec. MIL-T-7081C

Identified — 12 Foot Lengths

O.D. Inches	Wall Thickness			Approx.		O.D. Inches	Wall Thickness			Approx.	
	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot	Length	Dec. Inch	Stubs' Gage	Wt. Lbs. per Foot
3/16	.025	.23	.015	.18	3/8	.035	.20	.044	.53		
1/4	.028	.22	.023	.28		.049	.18	.059	.71		
	.035	.20	.028	.34	1/2	.035	.20	.060	.72		
3/8	.028	.22	.036	.43		.065	.16	.104	1.25		

ALCOA ALUMINUM TUBES**Alloy 6061-T6 Round Tubes****D—Drawn—Spec. WW-T-789b-1, Cond. T****E—Extruded—Spec. QQ-A-270 and AMS-4150B, Cond. T****Not Identified — 12 Foot Lengths**

O.D. Inches	Wall Thickness Dec. Inch	Approx. Wt. Lbs. per Foot	Length	O.D. Inches	Wall Thickness Dec. Inch	Approx. Wt. Lbs. per Foot	Length
3/16 . .	.035 D . . 20 . .	.020 . .	.235	1 3/8 . .	.035 D . . 20 . .	.172 . .	2.06
	.049 D . . 18 . .	.025 . .	.299		.058 D . . 17 . .	.281 . .	3.38
1/4 . .	.028 D . . 22 . .	.023 . .	.275		.083 D . . 14 . .	.396 . .	4.57
	.035 D . . 20 . .	.028 . .	.332	1 1/2 . .	.035 D . . 20 . .	.188 . .	2.26
	.049 D . . 18 . .	.036 . .	.436		.049 D . . 18 . .	.262 . .	3.14
	.058 D . . 17 . .	.041 . .	.492		.058 D . . 17 . .	.308 . .	3.69
5/16 . .	.035 D . . 20 . .	.036 . .	.428		.065 D . . 16 . .	.343 . .	4.11
	.049 D . . 18 . .	.048 . .	.570		.083 D . . 14 . .	.432 . .	5.19
	.058 D . . 17 . .	.055 . .	.658		.125 E . . 1/8 " . .	.635 . .	7.62
3/8 . .	.028 D . . 22 . .	.036 . .	.431		.188 D . . 3/16 " . .	.910 . .	10.92
	.035 D . . 20 . .	.041 . .	.524		.250 E . . 1/4 " . .	1.150 . .	13.80
	.049 D . . 18 . .	.059 . .	.708	1 5/8 . .	.035 D . . 20 . .	.205 . .	2.46
	.058 D . . 17 . .	.068 . .	.816		.058 D . . 17 . .	.335 . .	4.02
	.065 D . . 16 . .	.074 . .	.888	1 3/4 . .	.058 D . . 17 . .	.362 . .	4.34
7/16 . .	.035 D . . 20 . .	.052 . .	.624		.083 D . . 14 . .	.508 . .	6.10
	.049 D . . 18 . .	.070 . .	.840	1 7/8 † . .	.083 D . . 14 . .	.550 . .	6.60
	.065 D . . 16 . .	.089 . .	1.068	2 . .	.049 D . . 18 . .	.352 . .	4.22
1/2 . .	.028 D . . 22 . .	.049 . .	.588		.058 D . . 17 . .	.414 . .	4.97
	.035 D . . 20 . .	.060 . .	.720		.065 D . . 16 . .	.462 . .	5.54
	.049 D . . 18 . .	.082 . .	.984		.083 D . . 14 . .	.590 . .	7.08
	.058 D . . 17 . .	.095 . .	1.140		.125 E . . 1/8 " . .	.866 . .	10.39
	.065 D . . 16 . .	.104 . .	1.248		.250 E . . 1/4 " . .	1.620 . .	19.44
	.083 D . . 14 . .	.128 . .	1.536	2 1/4 . .	.049 D . . 18 . .	.398 . .	4.78
	.120 D . . 11 . .	.168 . .	2.016		.065 D . . 16 . .	.520 . .	6.24
	.083 D . . 14 . .	.166 . .	1.992		.083 D . . 14 . .	.660 . .	7.92
	.125 E . . 1/8 " . .	.980 . .	11.77		.125 E . . 1/8 " . .	.980 . .	11.77
5/8 . .	.035 D . . 20 . .	.076 . .	.912		.250 E . . 1/4 " . .	1.850 . .	22.20
	.049 D . . 18 . .	.104 . .	1.248	2 1/2 . .	.049 D . . 18 . .	.444 . .	5.33
	.058 D . . 17 . .	.121 . .	1.452		.065 D . . 16 . .	.58 . .	6.96
	.065 D . . 16 . .	.133 . .	1.596		.083 D . . 14 . .	.74 . .	8.88
	.083 D . . 14 . .	.166 . .	1.992		.125 E . . 1/8 " . .	1.10 . .	13.20
3/4 . .	.035 D . . 20 . .	.092 . .	1.104		.250 E . . 1/4 " . .	2.08 . .	24.96
	.049 D . . 18 . .	.126 . .	1.512		.500 M . . 1/2 " . .	3.70 . .	44.40
	.058 D . . 17 . .	.147 . .	1.76	2 3/4 . .	.500 E . . 1/2 " . .	4.16 . .	49.92
	.065 D . . 16 . .	.163 . .	1.95		.049 D . . 18 . .	.53 . .	6.36
	.083 D . . 14 . .	.203 . .	2.43		.065 D . . 16 . .	.70 . .	8.40
7/8 . .	.035 D . . 20 . .	.109 . .	1.31		.083 D . . 14 . .	.89 . .	10.68
	.049 D . . 18 . .	.148 . .	1.78		.125 E . . 1/8 " . .	1.33 . .	15.96
	.058 D . . 17 . .	.174 . .	2.09		.250 E . . 1/4 " . .	2.54 . .	30.48
	.065 D . . 16 . .	.193 . .	2.32		.500 E . . 1/2 " . .	4.62 . .	55.44
1 . .	.035 D . . 20 . .	.125 . .	1.50		.750 M . . 3/4 " . .	6.24 . .	74.88
	.049 D . . 18 . .	.171 . .	2.05	3 1/4 . .	.375 M . . 3/8 " . .	3.98 . .	47.76
	.058 D . . 17 . .	.201 . .	2.41		.500 M . . 1/2 " . .	5.08 . .	60.96
	.065 D . . 16 . .	.223 . .	2.68		.500 M . . 1/2 " . .	5.54 . .	66.48
	.083 D . . 14 . .	.281 . .	3.37	3 1/2 . .	.125 D . . 1/8 " . .	1.56 . .	18.72
	.125 D . . 1/8 " . .	.404 . .	4.85		.250 M . . 1/4 " . .	3.00 . .	36.00
1 1/8 . .	.058 D . . 17 . .	.227 . .	2.74		.500 M . . 1/2 " . .	7.76 . .	91.44
1 1/4 . .	.035 D . . 20 . .	.156 . .	1.87		.750 E . . 3/4 " . .	7.76 . .	91.44
	.049 D . . 18 . .	.216 . .	2.59	Continued on Page 77			
	.058 D . . 17 . .	.255 . .	3.06				
	.065 D . . 16 . .	.283 . .	3.40				
	.083 D . . 14 . .	.356 . .	4.27				

†16 Foot Lengths

M—Mechanical Tube differs from Extruded Tube only in closer tolerance and is identified.

ALCOA ALUMINUM TUBES**Alloy 6061-T6 Round Tubes (Cont.)****D—Drawn—Spec. WW-T-789b-1, Cond. T****E—Extruded—Spec. QQ-A-270 and AMS-4150B, Cond. T****Not Identified — 12 Foot Lengths**

O.D. Inches	Wall Thickness			Approx. Wt. Lbs. per Foot		Length	O.D. Inches	Wall Thickness			Approx. Wt. Lbs. per Foot		
	O.D. Dec. Inch	Dec. Inch	Approx. Wt. Lbs. per Foot	Length	O.D. Dec. Inch	Dec. Inch	Length	O.D. Dec. Inch	Dec. Inch	Approx. Wt. Lbs. per Foot	Length		
4	.125 D	1/8	1.79	21.48	5 1/2	.250 E	1/4	4.85	58.20	.500 M	1/2	9.24	110.88
	.250 M	1/4	3.46	41.52		.750 M	3/4	13.16	157.92				
	.500 M	1/2	6.47	77.64		1.000 E	1	16.62	199.44				
	.750 M	3/4	9.01	108.12	6	.500 E	1/2	10.16	121.92	.750 E	3/4	14.55	174.60
4 1/2	.125 D	1/8	2.02	24.24		1.000 M	1	18.48	221.76				
	.250 M	1/4	3.93	47.16		.500 M	1/2	12.01	144.12	.750 M	3/4	17.32	207.84
	.500 M	1/2	7.39	88.68		1.000 M	1	22.17	266.04				
	.750 M	3/4	10.39	124.68	7	.500 M	1/2	12.01	144.12	.750 M	3/4	13.85	166.20
5	.250 M	1/4	4.19	50.28		1.000 M	1	22.17	266.04	.750 M	3/4	20.09	241.08
	.312 D	5/16	5.40	64.80		1.000 M	1/2	13.85	166.20				
	.500 M	1/2	8.31	99.72	8	.500 M	1/2	13.85	166.20	.750 M	3/4	25.86	310.32
	.750 M	3/4	11.78	141.36		1.000 M	1	25.86	310.32				
	1.000 E	1	14.78	177.36									

M—Mechanical Tube differs from Extruded Tube only in closer tolerance and is identified.

Alloy 6061-T6 Round Drawn Tubes**Special Dimension Sizes****Spec. WW-T-789b-1, Cond. T****Not Identified — 12 Foot Lengths**

O.D. Dec. In.	I.D. Dec. In.	Approx.		Wt. Lbs. per Foot	Length	O.D. Dec. In.	I.D. Dec. In.	Approx.		Wt. Lbs. per Foot	Length
		Dec.	In.					Dec.	In.		
.438	.305	.089		1.068		.593	.443	.143		1.717	
.490	.350	.109		1.308		.625	.493	.184		2.208	
.525	.384	.118		1.416		.690	.534	.176		2.112	
.562	.412	.135		1.622		.851	.630	.301		3.612	

Alloy 6063-T5 Extruded Tubes**Not Identified — 21 Foot-1 Inch Lengths**

Dimension	Thickness	Wall		Approx.	Wt. Lbs. per Foot	Length	Dimension	Thickness	Wall		Approx.	Wt. Lbs. per Foot
		Dec.	In.	Dec.	In.				Dec.	In.		
Rectangular — Sharp Corner												
1/2x1	.125	.383		8.07			1 3/4x3 1/2	.125	.1486		31.21	
3/4x1 1/2	.125	.604		12.68			1 3/4x4	.125	.1633		34.29	
1 x1 1/2	.125	.677		14.22			1 3/4x4 1/2	.125	.1780		37.38	
1 x2	.125	.824		17.30			1 3/4x5	.125	.1927		40.47	
1 1/4x2 1/2	.125	1.045		21.95			2 x 3	.125	.1412		29.65	
1 1/2x2	.125	.971		20.39			2 x 5	.125	.2000		42.00	
1 3/4x3	.125	1.339		28.12								

Square — Sharp Corner

3/4 x 3/4	.125	.376		7.90			1 1/2 x 1 1/2	.125	.825		17.53	
1 x 1	.125	.526		11.05			1 3/4 x 1 3/4	.125	.974		20.45	
1 1/4 x 1 1/4	.125	.674		14.15			2 x 2	.125	1.126		23.65	

Round Drawn Furniture Tubes**18 Foot Lengths**

Type	O.D. Inches	Wall Thickness Decimal Inch	Stubs' Gage	Approx. Wt. Lbs. per Foot
1-Drawn	3/4	.049	18	.127
1-Welded	3/4	.049	18	.127

ALCOA ALUMINUM PIPE**Alloy 3003 Pipe — Standard I.P.S.**

20 Foot Lengths — Identified — Color Code, Pink

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Length
3003-H18 Drawn — Schedule 40					
† $\frac{1}{4}$	.088	.364	.540	.151	1.81
† $\frac{3}{8}$	.091	.493	.675	.202	2.42
$\frac{1}{2}$	.109	.622	.840	.294	5.88
$\frac{3}{4}$	.113	.824	1.050	.391	7.82

3003-H112 Extruded — Schedule 40

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Length
1	.133	1.049	1.315	.587	11.74
1 $\frac{1}{4}$	.140	1.380	1.660	.794	15.88
1 $\frac{1}{2}$	.145	1.610	1.900	.949	18.98
2	.154	2.067	2.375	1.277	25.54
2 $\frac{1}{2}$	.203	2.469	2.875	2.024	40.48
3	.216	3.068	3.500	2.647	52.94
4	.237	4.026	4.500	3.770	75.40
6	.280	6.065	6.625	6.630	132.60
8	.322	7.981	8.625	9.977	199.54

Alloy 6061-T6 Pipe — Standard I.P.S.

20 Foot Lengths — Identified — Color Code, Blue

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Length
Drawn — Schedule 40					
† $\frac{1}{8}$	.068	.269	.405	.085	1.02
† $\frac{1}{4}$	.088	.364	.540	.147	1.76
† $\frac{3}{8}$	.091	.493	.675	.196	2.35
$\frac{1}{2}$	.109	.622	.840	.294	5.88
$\frac{3}{4}$	.113	.824	1.050	.391	7.82

Extruded — Schedule 40

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Length
1	.133	1.049	1.315	.581	11.62
1 $\frac{1}{4}$	.140	1.380	1.660	.786	15.72
1 $\frac{1}{2}$	.145	1.610	1.900	.940	18.80
2	.154	2.067	2.375	1.264	25.28
2 $\frac{1}{2}$	.203	2.469	2.875	2.004	40.08
3	.216	3.068	3.500	2.621	52.42
3 $\frac{1}{2}$	.226	3.548	4.000	3.151	63.02
4	.237	4.026	4.500	3.733	74.66
5	.258	5.047	5.563	5.057	101.14
6	.280	6.065	6.625	6.564	131.28
8	.322	7.981	8.625	9.878	197.56
10	.365	10.020	10.750	14.000	280.00
†12	.375	12.000	12.750	17.140	205.68

Extruded — Extra Heavy — Schedule 80

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Length
1	.179	.957	1.315	.751	15.02
1 $\frac{1}{2}$	.200	1.500	1.900	1.256	25.12
2	.218	1.939	2.375	1.737	34.74
3	.300	2.900	3.500	3.547	70.94
3 $\frac{1}{2}$	.318	3.364	4.000	4.326	86.52
4	.337	3.826	4.500	5.183	103.66
5	.375	4.813	5.563	7.260	145.20
6	.432	5.761	6.625	9.979	199.58
8	.500	7.625	8.625	15.160	303.20

†12 Foot Lengths

ALCOA ALUMINUM PIPE**Alloy 6063-T5 Extruded Unitrace Pipe****Standard I.P.S.**

30 Foot Lengths — Color Code, Green

Nominal Size Inches	Approx. Wt. Lbs. per Foot	Approx. Wt. Lbs. per Length
1½.....	1.22.....	36.60.....
2	1.66.....	49.80.....

Alloy 6063-T6 Pipe — Standard I.P.S.

20 Foot Lengths — Identified — Color Code, Green

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Approx. Wt. Lbs. per Length
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Extruded — Schedule 5

2065.....	2.245.....	2.375.....	.555.....	11.10.....
3083.....	3.334.....	3.500.....	1.048.....	20.96.....
4083.....	4.334.....	4.500.....	1.354.....	27.08.....

Drawn — Schedule 40

†½.....	.068.....	.269.....	.405.....	.085.....	1.02.....
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Extruded — Schedule 40

1133.....	1.049.....	1.315.....	.581.....	11.62.....
1¼.....	.140.....	1.380.....	1.660.....	.786.....	15.72.....
1½.....	.145.....	1.610.....	1.900.....	.940.....	18.80.....
2 .....	.154.....	2.067.....	2.375.....	1.264.....	25.28.....
2½.....	.203.....	2.469.....	2.875.....	2.004.....	40.08.....
3 .....	.216.....	3.068.....	3.500.....	2.621.....	52.42.....
3½.....	.226.....	3.548.....	4.000.....	3.151.....	63.02.....
4 .....	.237.....	4.026.....	4.500.....	3.733.....	74.66.....
5 .....	.258.....	5.047.....	5.563.....	5.057.....	101.14.....
6 .....	.280.....	6.065.....	6.625.....	6.564.....	131.28.....
8 .....	.322.....	7.981.....	8.625.....	9.878.....	197.56.....
†12.....	.375.....	12.000.....	12.750.....	17.140.....	205.68.....

Alloy 6063-T6 Extruded Construction Pipe

20 Foot Lengths — Color Code, Green

Actual O.D. Inches	Wall Thickness Dec. In.	Foot	Approx. Wt. Lbs. per Length
2.....	.050.....	.360.....	7.20.....
3.....	.050.....	.545.....	11.00.....
4.....	.050.....	.730.....	14.60.....
5.....	.052.....	.951.....	19.00.....
6.....	.058.....	1.273.....	25.40.....
7.....	.064.....	1.640.....	32.80.....
8.....	.072.....	2.109.....	42.18.....

Alloy 6063-T-832 Drawn Handrail Pipe..

Standard I.P.S. — 20 Foot Lengths — Color Code, Green

Nominal Size Inches	Wall Thickness Dec. In.	I.D. Dec. In.	O.D. Dec. In.	Approx. Wt. Lbs. per Foot	Approx. Wt. Lbs. per Length
1¼.....	.140.....	1.38.....	1.66.....	.786.....	15.72.....
1½.....	.145.....	1.61.....	1.90.....	.940.....	18.80.....

†12 Foot Lengths—Standard Schedule

MAGNESIUM

A non-magnetic and virtually non-sparking rolled material with uniform quality and condition; clean, sound, smooth and free from severe buckles. Less than one-quarter the weight of steel and two-thirds that of aluminum. Pickled (acid dipped) to make corrosion resistant. Excellent welds made easily and quickly with inert gas shielded arc.

FLAT SHEETS**MECHANICAL PROPERTIES, MINIMUM**

Alloy & Temper	Thickness Inches	Tensile Strength	Yield Strength	Elongation in 2 Inches	
Thickness Dec. In.	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. In.	Sheet Size Inches	Approx. Wt. Lbs. per Sq. Ft.
AZ31B-H24	0.050-0.249	39,000 PSI	29,000 PSI	6%	
	0.250	38,000 PSI	26,000 PSI	8%	
AZ31B-O	0.050-0.250	32,000 PSI	15,000 PSI	12%	
HM21A-T8	0.050-0.250	33,000 PSI	18,000 PSI	6%	

AZ31B-O — SPEC. QQ-M-44A

.080...48x144....736....35.33	.090...48x144....828....39.74
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AZ31B-H24 — SPEC. QQ-M-44A

.063...48x144....580....27.84	.125...48x144....1.150....55.20
.080...48x144....736....35.33	.160...48x144....1.470....70.56
.090...48x144....828....39.74	.190...48x144....1.750....84.00
.100...48x144....920....44.16	.250...48x144....2.300....110.40

HM21A-T8 — SPEC. AMS-4390

.063...48x144....581....27.89	.143...48x144....1.361....65.33
.071...48x144....655....31.44	.160...48x144....1.473....70.70
.125...48x144....1.163....55.82	.250...48x144....2.315....111.12

PLATES — ALLOY AZ31B**MECHANICAL PROPERTIES, MINIMUM**

Type Plate	Thickness Inches	Tensile Strength	Yield Strength	Elongation in 2 Inches
Plate Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Plate Size Inches	Approx. Wt. Lbs. per Sq. Ft.	
Tooling	1/4-3 1/2	35,000 PSI	19,000 PSI	10%
Tread	1/4-3/4	32,000 PSI	15,000 PSI	8%

Thickness Dec. In.	Plate Size Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. In.	Plate Size Inches	Approx. Wt. Lbs. per Sq. Ft.		
1/4	48x96	2.39	76	1 1/2	48x96	13.98	448
3/8	48x96	3.47	111	1 3/4	48x60	16.19	324
1/2	48x96	4.63	147	2	36x72	18.68	336
5/8	48x96	5.78	184		48x60	18.68	374
3/4	48x96	6.95	221	2 1/2	48x60	23.00	460
1	48x96	9.38	295	3	48x30	27.60	276
1 1/4	48x96	11.61	372		48x48	27.60	442
1 1/2	36x84	13.98	294	3 1/2	48x24	32.25	258

TOOLING PLATE — Commercial Grade and Quality

1/4...48x96....2.39....76	1 1/2...48x96....13.98....448
3/8...48x96....3.47....111	1 3/4...48x60....16.19....324
1/2...48x96....4.63....147	2...36x72....18.68....336
5/8...48x96....5.78....184	48x60....18.68....374
3/4...48x96....6.95....221	2 1/2...48x60....23.00....460
1...48x96....9.38....295	3...48x30....27.60....276
1 1/4...48x96....11.61....372	48x48....27.60....442
1 1/2...36x84....13.98....294	3 1/2...48x24....32.25....258

TREAD PLATE — SPEC. MIL-F-46048 (Ord.)

1/4...48x144....2.47....119	3/8...48x144....3.67....176
60x144....2.47....148	60x144....3.67....220
5/16...48x144....3.07....147	1/2...48x144....4.79....230
60x144....3.07....184	60x144....4.79....287

APPROXIMATE RADII⁽¹⁾ FOR 90° COLD BEND ALUMINUM SHEETS AND PLATES

Alloy and Temper	Radii for Various Thicknesses Expressed in Terms of Thickness "q"						
	1/64 inch	1/32 inch	1/16 inch	1/8 inch	3/16 inch	1/4 inch	5/16 inch
1100-O	0	0	0	0	0	0	0
1100-H12	0	0	0	0	0-1t	0-1t	0-1t
1100-H14	0	0	0	0	0-1t	0-1t	0-1t
1100-H16	0	0	0-1t	1/2t-1/2t	1t-2t	1 1/2t-3t	2 1/2t-3 1/2t
1100-H18	0-1t	1/2t-1/2t	1t-2t	1 1/2t-3t	2t-4t	2t-4t	3t-5t
2024-O ⁽²⁾	0	0	0	0	0-1t	0-1t	0-1t
2024-T3 ⁽²⁾⁽³⁾	1 1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	6t-8t
2024-T36 ⁽²⁾	2t-4t	3t-5t	4t-6t	5t-7t	5t-7t	6t-10t	8t-11t
2024-T4 ⁽²⁾⁽³⁾	1 1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	6t-9t
2024-T81	3 1/2t-5t	4 1/2t-6t	5t-7t	6 1/2t-8t	7t-9t	8t-1pt	9t-11t
2024-T86	4t-5 1/2t	5t-7t	6t-8t	7t-10t	8t-11t	9t-11t	10t-13t
3003-O	0	0	0	0	0	0	0
3003-H12	0	0	0	0	0-1t	0-1t	0-1t
3003-H14	0	0	0	0-1t	0-1t	1t-2 1/2t	1 1/2t-3t
3003-H16	0-1t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	2 1/2t-4t
3003-H18	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	3t-5t	4t-6t	4t-7t
5005-O	0	0	0	0	0	0	0
5005-H12	0	0	0	0	0-1t	0-1t	0-1t
5005-H14	0	0	0	0-1t	0-1t	1/2t-1 1/2t	1 1/2t-3t
5005-H16	0-1t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	2 1/2t-4t
5005-H18	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	3t-5t	4t-6t	4t-7t
5005-H32	0	0	0	0	0-1t	0-1t	0-1t
5005-H34	0	0	0	0-1t	0-1t	1/2t-1 1/2t	1 1/2t-3t
5005-H36	0-1t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	2 1/2t-4t
5005-H38	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	3t-5t	4t-6t	4t-7t

(Continued on Page 82)

APPROXIMATE RADII⁽¹⁾ FOR 90° COLD BEND ALUMINUM SHEETS AND PLATES (Cont.)

Radii for Various Thicknesses Expressed in Terms of Thickness "t"						
Alloy and Temper	1/16 inch	1/32 inch	1/64 inch	1/8 inch	3/16 inch	1/4 inch
5052-O	0	0	0	0	0-1t	1/2t-1 1/2t
5052-H32	0	0	0	0-1t	1/2t-1 1/2t	1t-2t
5052-H34	0	0	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-2 1/2t
5052-H36	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	2 1/2t-3 1/2t
5052-H38	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t	3t-5t	3t-5 1/2t
5083-O	0-1t	0-1t	0-1t	0-1t	0-1t	4t-6t
5086-O	0	0	0	0	0-1t	1 1/2t-2t
5086-H32	0-1/2t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-2t	2t-3t
5086-H34	0-1t	1/2t-1 1/2t	1t-1 1/2t	1 1/2t-2 1/2t	2t-3t	2 1/2t-3 1/2t
5086-H36	0-1/2t	0-1/2t	0-1t	1/2t-3 1/2t	2 1/2t-4t	3t-4t
5086-H112	0-1/2t	0-1/2t	0-1t	1/2t-1 1/2t	1t-1 1/2t	3 1/2t-5 1/2t
6061-O	0	0	0	0	0-1t	1t-2t
6061-T6⁽⁴⁾	0-1t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t
6061-T6⁽⁴⁾	0-1t	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t	2t-4t
7075-O	0	0	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t
7075-T6⁽²⁾	2t-4t	3t-5t	4t-6t	5t-7t	5t-7t	6t-10t
7178-O	0	0	0-1t	1/2t-1 1/2t	1t-2t	1 1/2t-3t
7178-T6	2t-4t	3t-5t	4t-6t	5t-7t	5t-7t	6t-10t

⁽¹⁾Minimum permissible radius over which sheet or plate may be bent varies with nature of forming operation, type of forming equipment, and design and condition of tools. Minimum working radius for a given material or hardest alloy and temper for a given radius can be ascertained only by actual trial under contemplated conditions of fabrication.

⁽²⁾Alclad sheet can be bent over slightly smaller radii than the corresponding tempers of the uncoated alloy.

⁽³⁾Immediately after quenching, this alloy can be formed over appreciably smaller radii.

⁽⁴⁾Alcoa tread plate may require bend radii up to as much as twice the values listed for plain sheet and plate.

CHEMICAL COMPOSITION LIMITS FOR WROUGHT ALUMINUM ALLOYS

Composition in per cent; maximum unless shown as a range—Aluminum is the remainder

Alloy	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Zinc	Titanium	Other	Each ⁽⁵⁾	Total ⁽⁵⁾
1100 ⁽¹⁾	1.0 Si+Fe.	0.20	0.05	0.10	0.10	0.10	0.10	0.10	0.05 ⁽⁴⁾	0.15	0.15
2011 ⁽²⁾	0.40	0.7	5.0-6.0	0.20	0.05	0.10	0.10	0.10	0.05	0.05	0.15
2014	0.50-1.2	1.0	3.9-5.0	0.40-1.2	0.20-0.8	0.10	0.25	0.15	0.05	0.05	0.15
2017	0.8	1.0	3.5-4.5	0.40-1.0	0.20-0.8	0.10	0.25 ⁽³⁾	0.10	0.05	0.05	0.15
2024	0.50	0.50	3.8-4.9	0.30-0.9	1.2-1.8	0.10	0.25	0.10	0.05	0.05	0.15
2117	0.8	1.0	2.2-3.0	0.20	0.20-0.50	0.10	0.25	0.10	0.05	0.05	0.15
3003	0.6	0.7	0.20	1.0-1.5	0.10	0.10	0.10	0.10	0.05	0.05	0.15
5005	0.40	0.7	0.20	0.20	0.50-1.1	0.10	0.25	0.10	0.05	0.05	0.15
5052	0.45 Si+Fe	0.10	0.10	2.2-2.8	0.15-0.35	0.10	0.10	0.10	0.05	0.05	0.15
5056	0.30	0.40	0.10	0.05-0.20	4.5-5.6	0.05-0.20	0.10	0.10	0.05	0.05	0.15
5083	0.40	0.40	0.10	0.30-1.0	4.0-4.9	0.05-0.25	0.25	0.15	0.05	0.05	0.15
5086	0.40	0.50	0.10	0.20-0.7	3.5-4.5	0.05-0.25	0.25	0.15	0.05	0.05	0.15
6061	0.40-0.8	0.7	0.15-0.40	0.15	0.8-1.2	0.15-0.35	0.25	0.15	0.05	0.05	0.15
6062	0.40-0.8	0.7	0.15-0.40	0.15	0.8-1.2	0.04-0.14	0.25	0.15	0.05	0.05	0.15
6063	0.20-0.6	0.35	0.10	0.10	0.45-0.9	0.10	0.10	0.10	0.10	0.05	0.15
7075	0.50	0.7	1.2-2.0	0.30	2.1-2.9	0.18-0.40	5.1-6.1	0.20	0.05	0.05	0.15
7079	0.30	0.40	0.40-0.8	0.10-0.30	2.9-3.7	0.10-0.25	3.8-4.8	0.10	0.05	0.05	0.15
7178	0.50	0.7	1.6-2.4	0.30	2.4-3.1	0.18-0.40	6.3-7.3	0.20	0.05	0.05	0.15

(1) Minimum aluminum content—99.0%.

(2) Also contains 0.20-0.6 per cent each of lead and bismuth.

(3) Until maximum specification Mil-W-7986-1 is revised, zinc limit of 0.10 per cent maximum applies.

(4) When in the form of welding electrode the beryllium content will be 0.0008 maximum.

(5) Analysis is regularly made only for the elements for which specific limits are shown except for unalloyed aluminum. If, however, the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis is made to determine that these other elements are not in excess of the amount specified.

TYPICAL MECHANICAL PROPERTIES OF WROUGHT ALUMINUM ALLOYS⁽¹⁾

Alloy and Temper	TENSION			ELONGATION in 2 In. Per Cent			HARDNESS			SHEAR Strength PSI.			FATIGUE Endurance ⁽²⁾ Limit PSI.			MODULUS Modulus ⁽³⁾ of Elasticity PSI.		
	STRENGTH PSI.			1/16 Inch Thick Specimen			Brinell Number, 500-K. Load 10-mm. Ball			Shearing Strength PSI.								
	Ultimate	Yield	1/16 Inch Diameter Specimen	1/2 Inch Diameter Specimen	500-K. Load 10-mm. Ball	9,000	5,000	9,000	5,000	9,000	5,000	9,000	5,000	9,000	5,000	9,000	5,000	
1100-O	13,000	5,000	35	4.5	23	9,000	5,000	9,000	5,000	9,000	5,000	9,000	5,000	9,000	5,000	9,000	10,000 x 10 ⁶	
1100-H12	16,000	15,000	12	25	28	10,000	6,000	10,000	6,000	10,000	6,000	10,000	6,000	10,000	6,000	10,000	10,000 x 10 ⁶	
1100-H14	18,000	17,000	9	20	32	11,000	7,000	11,000	7,000	11,000	7,000	11,000	7,000	11,000	7,000	11,000	10,000 x 10 ⁶	
1100-H16	21,000	20,000	6	17	38	12,000	9,000	12,000	9,000	12,000	9,000	12,000	9,000	12,000	9,000	12,000	10,000 x 10 ⁶	
1100-H18	24,000	22,000	5	15	44	13,000	9,000	13,000	9,000	13,000	9,000	13,000	9,000	13,000	9,000	13,000	10,000 x 10 ⁶	
2011-T3	55,000(4)	43,000(4)	15	95	32,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,200 x 10 ⁶
2011-T6	57,000	39,000	17	97	34,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,200 x 10 ⁶
2011-T8	59,000	45,000	12	100	35,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,200 x 10 ⁶
2014-O	27,000	14,000	18	45	18,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	10,600 x 10 ⁶
2014-T4	62,000	42,000(10)	20	105	38,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	10,600 x 10 ⁶
2014-T6	70,000(5)	60,000(5)	13	135	42,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,600 x 10 ⁶
Alclad 2014-O	25,000	10,000	21			18,000												10,500 x 10 ⁶
Alclad 2014-T3	63,000(6)	40,000(6)	20			37,000												10,500 x 10 ⁶
Alclad 2014-T4	61,000(6)	37,000(6)	22			37,000												10,500 x 10 ⁶
Alclad 2014-T6	68,000(6)	60,000(6)	10			41,000												10,500 x 10 ⁶
2017-O	26,000	10,000	22	45	18,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	10,500 x 10 ⁶
2017-T4	62,000	40,000	22	105	38,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,500 x 10 ⁶
2024-O	27,000	11,000	20	47	18,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	10,600 x 10 ⁶
2024-T3	70,000	50,000	18	120	41,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	10,600 x 10 ⁶
2024-T36	72,000	57,000	13	130	42,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,600 x 10 ⁶
2024-T4	68,000(5)	47,000(5)	20	19	41,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	10,600 x 10 ⁶
2024-T81	70,000	65,000	6	128	43,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,600 x 10 ⁶
2024-T86	75,000	71,000	6	135	45,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	10,600 x 10 ⁶
Alclad 2024-O	26,000	11,000	20			18,000												10,600 x 10 ⁶
Alclad 2024-T3	65,000(7)	45,000(7)	18			40,000												10,600 x 10 ⁶
Alclad 2024-T36	67,000(7)	53,000(7)	11			41,000												10,600 x 10 ⁶
Alclad 2024-T4	64,000(7)	42,000(7)	19			40,000												10,600 x 10 ⁶

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TYPICAL MECHANICAL PROPERTIES OF WROUGHT ALUMINUM ALLOYS⁽¹⁾ (Cont.)

Alloy and Temper	TENSION			HARDNESS			Modulus ⁽³⁾ of Elasticity PSI.	
	ELONGATION in 2 In. Per Cent			Brinell Number, 500-Kg. Load		Shearing Strength PSI.		
	Strength PSI.	Ultimate Yield	1/16 Inch Thick Specimen	1/2 Inch Diameter Specimen	10-mm. Ball			
Alclad 2024-T81	65,000 ⁽⁷⁾	60,000 ⁽⁷⁾	6	40,000	40,000	40,000	10.6 x 10 ⁶ (12)	
Alclad 2024-T86	70,000 ⁽⁷⁾	66,000 ⁽⁷⁾	6	42,000	42,000	42,000	10.6 x 10 ⁶ (12)	
2117-T4	43,000	24,000	27	70	28,000	14,000	10.3 x 10 ⁶	
3003-O	16,000	6,000	30	28	11,000	7,000	10.0 x 10 ⁶	
3003-H12	19,000	18,000	10	20	35	8,000	10.0 x 10 ⁶	
3003-H14	22,000	21,000	8	16	40	9,000	10.0 x 10 ⁶	
3003-H16	26,000	25,000	5	14	47	15,000	10.0 x 10 ⁶	
3003-H18	29,000	27,000	4	10	55	16,000	10,000	
Alclad 3003-O	16,000	6,000	30	40	11,000	11,000	10.0 x 10 ⁶	
Alclad 3003-H12	19,000	18,000	10	20	20,000	12,000	10.0 x 10 ⁶	
Alclad 3003-H14	22,000	21,000	8	16	14,000	14,000	10.0 x 10 ⁶	
Alclad 3003-H16	26,000	25,000	5	14	15,000	15,000	10.0 x 10 ⁶	
Alclad 3003-H18	29,000	27,000	4	10	28	16,000	16,000	
5005-O	18,000	6,000	30	40	11,000	11,000	10.0 x 10 ⁶	
5005-H12	20,000	19,000	10	14	14,000	14,000	10.0 x 10 ⁶	
5005-H14	23,000	22,000	6	10	14,000	14,000	10.0 x 10 ⁶	
5005-H16	26,000	25,000	5	15,000	15,000	15,000	10.0 x 10 ⁶	
5005-H18	29,000	28,000	4	16,000	16,000	16,000	10.0 x 10 ⁶	
5005-H32	20,000	17,000	11	36	14,000	14,000	10.0 x 10 ⁶	
5005-H34	23,000	20,000	8	41	14,000	14,000	10.0 x 10 ⁶	
5005-H36	26,000	24,000	6	46	15,000	15,000	10.0 x 10 ⁶	
5005-H38	29,000	27,000	5	51	16,000	16,000	10.0 x 10 ⁶	
5052-O	28,000	13,000	25	47	18,000	17,000	10.2 x 10 ⁶	
5052-H32	33,000	28,000	12	60	20,000	21,000	10.2 x 10 ⁶	
5052-H34	38,000	31,000	10	68	18,000	18,000	10.2 x 10 ⁶	
5052-H36	40,000	35,000	8	73	23,000	19,000	10.2 x 10 ⁶	
5052-H38	42,000	37,000	7	77	24,000	20,000	10.2 x 10 ⁶	

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TYPICAL MECHANICAL PROPERTIES OF WROUGHT ALUMINUM ALLOYS⁽¹⁾ (Cont.)

Alloy and Temper	TENSION		ELONGATION in 2 in. Per Cent		HARDNESS		Shear Strength Psi.	Endurance ⁽²⁾ Limit Psi.	Modulus ⁽³⁾ of Elasticity Psi.
	Strength Psi.		Yield Ultimate	1/16 Inch Thick Specimen	Brinell Number, 500-Kg. Load 10-mm. Ball				
	Strength Psi.	Ultimate	1/16 Inch Thick Specimen	Diameter Specimen	10-mm. Ball				
5056-O	42,000	22,000	3.5	65	26,000	20,000	.....	10.3 x 10 ⁶	
5056-H18	63,000	59,000	1.0	105	34,000	22,000	.....	10.3 x 10 ⁶	
5056-H38	60,000	50,000	1.5	100	32,000	22,000	.....	10.3 x 10 ⁶	
5083-O	42,000	21,000	22	.....	25,000	.....	23,000	10.3 x 10 ⁶	
5083-H113	46,000	33,000	1.6	.....	.....	.....	23,000	10.3 x 10 ⁶	
5086-O	38,000	17,000	22	.....	23,000	.....	23,000	10.3 x 10 ⁶	
5086-H32	42,000	30,000	12	.....	.....	.....	23,000	10.3 x 10 ⁶	
5086-H34	47,000	37,000	10	.....	27,000	.....	27,000	10.3 x 10 ⁶	
5086-H112	39,000	19,000	14	.....	.....	.....	27,000	10.3 x 10 ⁶	
6061-O	18,000	8,000	25	30	30	12,000	9,000	10.0 x 10 ⁶	
6061-T4	35,000	21,000	22	25	65	24,000	14,000	10.0 x 10 ⁶	
6061-T6	45,000 ⁽⁹⁾	40,000 ⁽⁹⁾	12	17	95	30,000	14,000	10.0 x 10 ⁶	
Alclad 6061-O	17,000	7,000	25	.....	.....	11,000	.....	10.0 x 10 ⁶	
Alclad 6061-T4	33,000	19,000	22	.....	.....	22,000	.....	10.0 x 10 ⁶	
Alclad 6061-T6	42,000	37,000	12	.....	.....	27,000	.....	10.0 x 10 ⁶	
6062-O	18,000	8,000	30	30	30	12,000	9,000	10.0 x 10 ⁶	
6062-T4	35,000	21,000	25	65	65	24,000	14,000	10.0 x 10 ⁶	
6062-T6	45,000	40,000	17	95	95	30,000	14,000	10.0 x 10 ⁶	
6063-O	13,000	7,000	.....	25	10,000	8,000	8,000	10.0 x 10 ⁶	
6063-T4	25,000	13,000	22	.....	16,000	16,000	16,000	10.0 x 10 ⁶	
6063-T42	22,000	13,000	20	48	14,000	9,000	9,000	10.0 x 10 ⁶	
6063-T5	27,000	21,000	12	60	17,000	10,000	10,000	10.0 x 10 ⁶	
6063-T6	35,000	31,000	12	75	22,000	10,000	10,000	10.0 x 10 ⁶	
6063-T83	37,000	35,000	9	80	22,000	18,000	18,000	10.0 x 10 ⁶	
6063-T831	30,000	27,000	10	67	10,000	14,000	14,000	10.0 x 10 ⁶	
6063-T832	42,000	39,000	12	90	27,000	10,000	10,000	10.0 x 10 ⁶	
6063-T835	48,000	43,000	8	105	30,000	10,000	10,000	10.0 x 10 ⁶	

(Continued on Page 87)

TYPICAL MECHANICAL PROPERTIES OF WROUGHT ALUMINUM ALLOYS⁽¹⁾ (Cont.)

Alloy and Temper	TENSION		HARDNESS			Modulus ⁽³⁾ of Elasticity PSI.
	STRENGTH PSI.		ELONGATION in 2 In. Per Cent		Brinell Number, 500-Kg. Load 10-mm. Ball	
	Ultimate	Yield	1/16 Inch Thick Specimen	1/2 Inch Diameter Specimen	Shearing Strength PSI.	
7075-O	33,000	15,000	17	16	22,000	10.4 x 10 ⁶
7075-T6	83,000 ⁽⁸⁾⁽¹¹⁾	73,000 ⁽⁸⁾⁽¹¹⁾	11	150	48,000	10.4 x 10 ⁶
Alclad 7075-O	32,000	14,000	17		22,000	10.4 x 10 ⁶⁽¹²⁾
Alclad 7075-T6	76,000	67,000	11		46,000	10.4 x 10 ⁶⁽¹²⁾
7079-T6	78,000	68,000	14	145	45,000	10.4 x 10 ⁶
7178-O	33,000	15,000	15	16	22,000	10.4 x 10 ⁶
7178-T6	88,000 ⁽⁸⁾	78,000 ⁽⁸⁾	10	11	52,000	10.4 x 10 ⁶
Alclad 7178-O	32,000	14,000	16		22,000	10.4 x 10 ⁶⁽¹²⁾
Alclad 7178-T6	81,000	71,000	10		49,000	10.4 x 10 ⁶⁽¹²⁾

(1)These typical properties are average for various forms, sizes and methods of manufacture, and may not exactly describe any one particular product.

(2)Based on 500,000,000 cycles of completely reversed stress using the R. R.

Moore type of machine and specimen.

(3)Average of tension and compression moduli. Compression modulus is about 2 per cent greater than tension modulus.

(4)Sizes greater than 1½ inches will have strengths slightly lower than these values.

(5)Extruded products more than ¾ inch thick will have strengths 15 to 20 per cent higher than these values.

(6)Sheet less than 0.040 inch thick will have strengths slightly lower than these values.

(7)Sheet more than 0.062 inch thick will have strengths slightly higher than these values.

(8)Extruded products will have strengths approximately 10 per cent higher than these values.

(9)Die forgings will have strengths approximately 5 per cent higher than these values.

(10)Die forgings will have a yield strength approximately 20 per cent lower than these values.

(11)Die forgings have strengths approximately 4 per cent lower than these values.

(12)Value shown is primary modulus. Secondary modulus is from 3 per cent to 10 per cent lower depending on thickness of cladding.

TYPICAL CHARACTERISTICS⁽¹⁾ OF WROUGHT ALUMINUM ALLOYS

Alloy and Temper	Resist- ance to Cor- rosion	Work- ability (Cold)	Ma- chine- ability	Braze- ability	Weldability			Resist- ance Spot and Seam	Forge- ability
					Gas	Arc			
1100-O	A	A	D	A	A	A	A	B	A
-H12	A	A	D	A	A	A	A	A	A
-H14	A	A	C	A	A	A	A	A	A
-H16	A	B	C	A	A	A	A	A	A
-H18	A	C	C	A	A	A	A	A	A
2011-T3	C	C	A	D	D	D	D	B	
-T8	C	D	A	D	D	D	D	B	
2014-T4	C	C	B	D	D	B	B	B	C
-T6	C	D	B	D	D	B	B	B	C
2017-T4	C	C	B	D	D	B	B	B	
2024-T3	C	C	B	D	D	B	B	B	
-T4	C	C	B	D	D	B	B	B	
-T36	C	D	B	D	D	B	B	B	
2117-T4	C	B	C	D	D	B	B	B	
3003-O	A	A	D	A	A	A	A	B	A
-H12	A	A	D	A	A	A	A	A	A
-H14	A	B	C	A	A	A	A	A	A
-H16,-H18	A	C	C	A	A	A	A	A	A
5005-O	A	A	D	B	A	A	A	B	
-H12	A	A	D	B	A	A	A	A	
-H14	A	B	C	B	A	A	A	A	
-H16	A	C	C	B	A	A	A	A	
-H18	A	C	C	B	A	A	A	A	
-H32	A	A	D	B	A	A	A	A	
-H34	A	B	C	B	A	A	A	A	
-H36,-H38	A	C	C	B	A	A	A	A	
5052-O	A	A	D	C	A	A	A	B	
-H32	A	B	D	C	A	A	A	A	
-H34	A	B	C	C	A	A	A	A	
-H36,-H38	A	C	C	C	A	A	A	A	
5056-O	A	A	D	D	C	A	A	B	
-H38	C	C	C	D	C	A	A	A	
5086-O	A	A	D	D	C	A	A	B	
-H32	A	B	D	D	C	A	A	A	
-H34	B	C	C	D	C	A	A	A	
-H36,-H38	B	C	C	D	C	A	A	A	
6061-O	A	A	D	A	A	A	A	B	
-T4,-T6	A	C	C	A	A	A	A	A	
6062-O	A	A	D	A	A	A	A	B	
-T4,-T6	A	C	C	A	A	A	A	A	
6063-O	A	A	D	A	A	A	A	B	
-T4	A	B	C	A	A	A	A	A	
-T5	A	B	C	A	A	A	A	A	
-T6	A	C	C	A	A	A	A	A	
-T42	A	B	C	A	A	A	A	A	
-T83	A	C	C	A	A	A	A	A	
-T831	A	C	C	A	A	A	A	A	
-T832	A	C	C	A	A	A	A	A	
7075-T6	C	D	B	D	D	B	B	D	

⁽¹⁾Resistance to Corrosion, Workability (Cold), Machineability and Forgeability ratings A, B, C and D are relative ratings in decreasing order of merit. Weldability and Brazeability ratings A, B, C and D are relative ratings defined as follows:

- A. Generally weldable by all commercial procedures and methods.
- B. Weldable with special technique or on specific applications which justify preliminary trials or testing to develop welding procedure and weld performance.
- C. Limited weldability because of crack sensitivity or loss in resistance to corrosion, and all mechanical properties.
- D. No commonly used welding methods have so far been developed.

**TYPICAL PHYSICAL PROPERTIES OF
WROUGHT ALLOYS AND SELECTED METALS**

Alloy and Temper	Specific Gravity	Weight Lb. per Cu. In.	Melting Range Approximate Degrees F	Electrical Con-ductivity, at 20° C (68° F) ⁽¹⁾	Thermal Conductivity at 25° C (77° F) C.G.S. Units ⁽²⁾
1100-O	2.71	.098	1190-1215	59	.53
1100-H18	2.71	.098		59	.53
2011-T3	2.82	.102	995-1190	39	.36
2011-T8	2.82	.102		45	.41
2014-O	2.80	.101		50	.46
2014-T4	2.80	.101	950-1180	34	.32
2014-T6	2.80	.101		40	.37
2017-O	2.79	.101	955-1185	50	.46
2017-T4	2.79	.101		34	.32
2024-O	2.77	.100		50	.46
2024-T3, T4, T36	2.77	.100	935-1180	30	.29
2024-T6, T81, T86	2.77	.100		38	.35
2117-T4	2.74	.099	950-1200	40	.37
3003-O	2.73	.099	1190-1210	46	.42
3003-H18	2.73	.099		46	.42
5005-O	2.70	.098	1170-1205	52	.48
5005-H38	2.70	.098		52	.48
5052-O	2.68	.097	1125-1200	35	.33
5052-H38	2.68	.097		35	.33
5056-O	2.64	.095	1055-1180	29	.28
5056-H38	2.64	.095		29	.28
5083-O	2.66	.096		29	.28
5083-H34	2.66	.096	1075-1185	29	.28
5083-H113	2.66	.096		29	.28
5086-O	2.66	.096	1085-1185	32	.30
5086-H34	2.66	.096		32	.30
6061-O	2.70	.098		45	.41
6061-T4	2.70	.098	1100-1205	40	.37
6061-T6	2.70	.098		43	.40
6062-O	2.70	.098	1100-1205	45	.41
6062-T4, T6	2.70	.098		40	.37
6063-O	2.70	.098		58	.52
6063-T42	2.70	.098	1140-1205	50	.46
6063-T5	2.70	.098		55	.50
6063-T6	2.70	.098		53	.48
7075-T6	2.80	.101	890-1180	33	.31
7079-T6	2.74	.099	900-1180	32	.30
7178-T6	2.81	.102	890-1165	31	.29
Brass (35% Zinc)	8.46	.306	1660-1715	26	.29 ⁽³⁾
Copper	8.90	.322	1949-1981	97	.93 ⁽³⁾
Magnesium	1.80	.065	950-1150	12.3	.19 ⁽³⁾
Monel ⁽⁴⁾	8.80	.318	2370-2460	3.6	.06 ⁽³⁾
Steel					
Structural ⁽⁵⁾	7.85	.283	2765	12	.14 ⁽³⁾
Stainless 18-8	7.90	.288	2600-2680	2.4	.04 ⁽³⁾

⁽¹⁾In per cent of International Annealed Copper Standard.

⁽²⁾CGS units—Cal/cm/cm²/°C/sec.

⁽³⁾Thermal Conductivity at 212°F.

⁽⁴⁾67% Ni, 30% Cu.

⁽⁵⁾Hot rolled.

CORROSION RESISTANCE OF NON-FERROUS METALS

We wish to emphasize that the following is only a guide and not the final word on choosing the best metal for an application. Varying conditions make it impossible to give anything but a general picture.

NG (No Good) F (Fair) G (Good) E (Excellent)	Brass and Naval Bronze	Silicon Bronze	Copper	Aluminum
Acetate Solvents, Crude.....	F	G	G	E
Acetate Solvents, Pure.....	E	E	E	E
Acetate Acid, Crude.....	F(1)	G	G	G
Acetic Acid (Pure).....	F(1)	G	G	E
Acetic Acid Vapors.....	NG	G	G	G
Acetic Anhydride.....	NG	G	G	E
Acetone.....	E	E	E	E
Acetylene.....	(2)	NG	NG	E
Alcohols.....	G	E	E	G
Aluminum Sulfate.....	F(1)	G	G	F
Alums.....	F(1)	G	G	E
Ammonia Gas (22).....	NG(3) (4)	(4)	(4)	E
Ammonium Chloride.....	F(1)	G	G	NG
Ammonium Hydroxide.....	NG	NG	NG	G
Ammonium Nitrate.....	NG	F	F	E
Ammonium Phosphate (Ammoniacal).....	NG	NG	NG	NG
Ammonium Phosphate (Neutral).....	F	F	F	F
Ammonium Phosphate (Acid).....	F(1)	F	F	F
Ammonium Sulfate.....	F(1)	F	F	G(17)
Asphalt.....	G	E	E	E
Beer.....	G	G	G	E
Beet Sugar Liquors.....	G	E	E	E
Benzene or Benzol (19).....	E	E	E	E
Benzine (19).....	E	E	E	E
Borax.....	G	G	G	G
Boric Acid.....	F(1)	G	G	E
Butane, Butylene, Bitadiene (20).....	E(16)	E(16)	E(16)	E
Calcium Bisulfite.....	NG	G	G	NG
Calcium Hypochlorite.....	F	F	F	NG
Cane Sugar Liquors.....	G	E	E	E
Carbon Dioxide (Dry).....	E	E	E	E
Carbon Dioxide (Wet) and (Aqueous Solution).....	F(5)	G (5)	G(5)	E
Carbon Disulfide.....	F	NG	NG	E
Carbon Tetrachloride (23).....	E	E	E	G
Chlorine (Dry).....	G	G	G	NG
Chlorine (Wet).....	NG	F	F	NG
Chromic Acid.....	NG	NG	NG	NG
Citric Acid.....	F(1)	G	G	G
Coke Oven Gas.....	F	F	F	G
Copper Sulfate.....	NG	F	F	NG
Core Oils.....	E	E	E	E
Cottonseed Oil.....	E	E	E	E
Creosote.....	F	G	G	G
Ethers.....	E	E	E	E
Ethylene Glycol.....	G	E	E	G
Ferric Chloride.....	NG	NG	NG	NG
Ferric Sulfate.....	NG	F	F	G
Formaldehyde.....	G	G	G	G
Formic Acid.....	F(1)	G	G	NG
Freon.....	E	E	E	G
Furfural.....	G	G	G	E
Gasoline (Sour).....	F	NG	NG	NG
Gasoline (Refined).....	E	E	E	E
Gelatine.....	F(6)	E(6)	E(6)	E
Glucose.....	E	E	E	E
Glue.....	F	E	E	F
Glycerine or Glycerol.....	G	E	E	E
Hydrochloric Acid.....	NG	F(7)	F(7)	NG
Hydrocyanic Acid (Hydrogen Cyanide).....	NG	NG	NG	E

CORROSION RESISTANCE OF NON-FERROUS METALS (Cont.)

NG (No Good) F (Fair) G (Good) E (Excellent)	Brass and Naval Bronze	Silicon Bronze	Copper	Aluminum
Hydrofluoric Acid.....	NG	F	F	NG
Hydrogen Fluoride.....	F	G	G	NG
Hydrogen (20).....	E	E	E	E
Hydrogen Peroxide.....	NG	F	F	G
Hydrogen Sulfide (Dry).....	F(4)	NG(4)	NG(4)	E
Hydrogen Sulfide (Wet and Aqueous Solution).....	F	NG	NG	E
Lacquers and Lacquer Solvents.....	F	E	E	E
Lime-Sulfur.....	NG	F	F	NG
Magnesium Chloride.....	F	G	G	NG
Magnesium Hydroxide.....	G	E	E	F
Magnesium Sulfate.....	G	E	E	G
Mercuric Chloride.....	NG	NG	NG	NG
Mercury.....	NG	NG	NG	NG
Milk.....	F	F	F	E
Molasses.....	G	E	E	E
Natural Gas.....	G	E	E	E
Nickel Chloride (18).....	NG	F	F	NG
Nickel Sulfate (18).....	F	G	G	NG
Nitric Acid.....	NG	NG	NG	F
Oleic Acid.....	F(8)	G(10)	G(10)	E
Oxalic Acid.....	F(1)	G	G	NG
Oxygen (20).....	E	E	E	E
Palmitic Acid.....	F(8)	G(10)	G(10)	E
Petroleum Oils (Sour).....	F	NG	NG	NG
Petroleum Oils (Refined).....	E	E	E	E
Phosphoric Acid 25%.....	NG	G(9)	G(9)	NG
Phosphoric Acid 25%, 50%.....	NG	G(9)	G(9)	NG
Phosphoric Acid 50%, 85%.....	NG	G(9)	G(9)	E
Picric Acid.....	NG	NG	NG	F
Potassium Chloride.....	F	G	G	NG
Potassium Hydroxide.....	NG	F	F	NG
Potassium Sulfate.....	G	E	E	E
Propane (20).....	E	E	E	E
Rosin (Dark).....	G	G	G	E
Rosin (Light).....	NG	NG	NG	G
Shellac.....	G	E	E	E
Soda Ash (Sodium Carbonate).....	G	G	E	NG
Sodium Bicarbonate.....	E	E	E	G
Sodium Bisulfate.....	F(1)	G	G	F
Sodium Chloride.....	F	G	G	G
Sodium Cyanide.....	NG	NG	NG	NG
Sodium Hydroxide.....	NG	F	F	NG
Sodium Hypochlorite.....	NG	F	F	NG
Sodium Metaphosphate.....	F	G	G	F
Sodium Nitrate.....	F	G	G	E
Sodium Perborate.....	F	G	G	F
Sodium Peroxide.....	F	G	G	F
Sodium Phosphate (Alkaline).....	F	G	G	NG
Sodium Phosphate (Neutral).....	G	E	E	NG
Sodium Phosphate (Acid).....	F(1)	G	G	NG
Sodium Silicate.....	F	G	G	G
Sodium Sulfate.....	G	E	E	E
Sodium Sulfide.....	NG	NG	NG	NG
Sodium Thiosulfate (Hypo).....	NG	NG	NG	E
Sludge Acid.....	NG	G	G	NG
Stearic Acid.....	F(8)	G(10)	G(10)	E
Sulfate Liquors.....	NG	NG	NG	NG
Sulfur.....	F	F	F	E
Sulfur Chloride.....	NG	NG	NG	NG
Sulfur Dioxide (Dry) (20).....	F	E	E	G
Sulfur Dioxide (Wet).....	NG	G	G	F

CORROSION RESISTANCE OF NON-FERROUS METALS (Cont.)

NG (No Good) F (Fair) G (Good) E (Excellent)	Brass and Naval Bronze	Silicon Bronze	Copper	Aluminum
Sulfuric Acid 10%.....	NG	G(11)	G	NG
Sulfuric Acid 10%, 75%.....	NG	F	F	NG
Sulfuric Acid 75%, 95%.....	NG	F(12)	F(12)	NG
Sulfuric Acid 95%.....	NG	F	NG	F
Sulfurous Acid.....	NG	G	G	NG
Tar.....	G	E	E	E
Tartaric Acid.....	F(1)	G	G	G
Toluene or Toluol (19).....	E	E	E	E
Trichloroethylene (23).....	E	E	E	E
Turpentine.....	F(13)	E	E	E
Varnish (21).....	G	G	G	E
Vegetable Oils (21).....	G	G	G	E
Vinegar (11).....	NG	G	G	E
Water (Acid Mine Water).....	NG	(14)	(14)	F
Water (Fresh).....	F(15)	G	G	E
Water (Salt).....	F(15)	G	G	G
Whiskey.....	G	G	G	F
Wines.....	G	G	G	F
Xylene or Xylol (19).....	E	E	E	E
Zinc Chloride.....	NG	G	G	NG
Zinc Sulfate.....	F	G	G	G

Footnotes to Corrosion Resistance of Non-Ferrous Metals

- (1) Subject to dezincification and/or stress corrosion; especially at elevated temperatures and with concentrated solutions.
- (2) Alloys containing up to 60% copper acceptable; high copper alloys not acceptable.
- (3) Subject to stress corrosion with low concentrations.
- (4) Apparently resistant to dry gas at ordinary temperatures; attacked rapidly by moist gas and by hot gas.
- (5) Not recommended for use with carbonated beverages.
- (6) Not recommended for use with edible grades.
- (7) Only with dilute or unaerated solutions.
- (8) Not recommended for temperatures over 100°C (212°F).
- (9) Up to 60°C (140°F).
- (10) Not recommended for temperatures over 200°C (390°F).
- (11) Non-ferrous alloys preferred when unaerated and at temperatures above normal. Stainless Steel best when aerated and at normal to moderate temperatures.
- (12) With cold acid only.
- (13) Crude product may contain acids which corrode these materials.
- (14) Good with water containing no oxidizing salts; fair with water containing oxidizing salts.
- (15) Subject to dezincification with hot and/or aerated waters.
- (16) Copper may act as a catalyst for undesirable reactions.
- (17) Free sulphuric acid absent.
- (18) None of these materials recommended for use with nickel plating solutions.
- (19) Chemicals used for treating in manufacture assumed to be absent.
- (20) Temperature assumed to be no higher than that normally encountered in compression storage and distribution.
- (21) Some of these ratings may not apply when handling light color products at elevated temperatures (200°C) (390°F).
- (22) Temperatures assumed to be below that at which gas cracks and liberates nascent nitrogen.
- (23) Water assumed to be absent.

ALUMINUM — NARROW STRIPS APPROXIMATE WEIGHTS PER LINEAL FOOT IN POUNDS
Widths in Inches

B&S Gage	Thickness Inches	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8
8	.1285	.0095	.0190	.0285	.0381	.0476	.0671	.0666	.0761	.0856	.0951
9	.1144	.0085	.0170	.0255	.0340	.0425	.0508	.0593	.0678	.0763	.0848
10	.1019	.0075	.0151	.0226	.0302	.0377	.0453	.0528	.0604	.0679	.0754
11	.0907	.0067	.0134	.0201	.0269	.0336	.0403	.0570	.0537	.0604	.0671
12	.0808	.0060	.0120	.0180	.0239	.0299	.0359	.0419	.0478	.0538	.0598
13	.0720	.0053	.0107	.0160	.0213	.0266	.0320	.0373	.0427	.0480	.0533
14	.0641	.0047	.0095	.0142	.0190	.0237	.0285	.0332	.0380	.0427	.0474
15	.0571	.0042	.0084	.0126	.0169	.0211	.0253	.0295	.0338	.0380	.0422
16	.0508	.0038	.0075	.0113	.0150	.0188	.0226	.0264	.0301	.0339	.0377
17	.0453	.0034	.0067	.0101	.0134	.0168	.0201	.0235	.0268	.0302	.0336
18	.0403	.0030	.0060	.0090	.0119	.0149	.0180	.0210	.0239	.0269	.0299
19	.0359	.0026	.0053	.0079	.0106	.0132	.0160	.0186	.0212	.0238	.0264
20	.0320	.0024	.0047	.0071	.0095	.0119	.0142	.0166	.0190	.0214	.0238
21	.0285	.0021	.0042	.0063	.0084	.0105	.0126	.0147	.0169	.0190	.0211
22	.0254	.0019	.0037	.0056	.0075	.0094	.0112	.0131	.0150	.0169	.0188
23	.0226	.0017	.0034	.0051	.0067	.0084	.0101	.0118	.0134	.0151	.0168
24	.0201	.0015	.0030	.0045	.0060	.0075	.0089	.0104	.0119	.0134	.0149
25	.0179	.0013	.0026	.0039	.0053	.0066	.0080	.0093	.0106	.0119	.0132
26	.0159	.0012	.0024	.0036	.0047	.0059	.0071	.0083	.0094	.0106	.0118
27	.0142	.0011	.0021	.0032	.0042	.0053	.0063	.0074	.0084	.0095	.0106
28	.0126	.0009	.0019	.0028	.0037	.0046	.0056	.0065	.0075	.0084	.0099
29	.0113	.0008	.0017	.0025	.0034	.0042	.0050	.0058	.0067	.0075	.0084
30	.0100	.0007	.0015	.0022	.0030	.0037	.0045	.0052	.0059	.0066	.0074

ALUMINUM — NARROW STRIPS APPROXIMATE WEIGHTS PER LINEAL FOOT IN POUNDS
Widths in Inches

B&S Gage	Thickness Inches	1 $\frac{1}{16}$	3/4	1 $\frac{1}{16}$	7/8	1 $\frac{5}{16}$	1	1 $\frac{1}{2}$	2	3	4	5	6
8.	.1285	.1046	.1142	.1237	.1332	.1427	.1522	.1617	.1710	.1804	.1900	.2000	.2100
9.	.1144	.0933	.1017	.1102	.1187	.1272	.1355	.1427	.1500	.1584	.1664	.1741	.1819
10.	.1019	.1829	.1905	.1980	.1055	.1130	.1207	.1284	.1362	.1439	.1528	.1603	.1724
11.	.0907	.0738	.0806	.0873	.0940	.1007	.1074	.1149	.1223	.1297	.1371	.1445	
12.	.0808	.0658	.0718	.0778	.0838	.0898	.0957	.1014	.1071	.1129	.1184	.1242	
13.	.0720	.0586	.0640	.0693	.0746	.0799	.0853	.0906	.1059	.1106	.1159	.1259	
14.	.0641	.0521	.0570	.0617	.0664	.0711	.0759	.0811	.0878	.0929	.0981	.1037	
15.	.0571	.0464	.0505	.0549	.0591	.0633	.0676	.0719	.0753	.0805	.0847	.0909	
16.	.0508	.0415	.0451	.0489	.0527	.0565	.0602	.0638	.0675	.0713	.0750	.0809	
17.	.0453	.0370	.0402	.0436	.0470	.0504	.0536	.0573	.0609	.0646	.0683	.0721	
18.	.0403	.0329	.0358	.0388	.0418	.0448	.0477	.0505	.0532	.0561	.0590	.0627	
19.	.0359	.0290	.0319	.0345	.0371	.0397	.0425	.0450	.0477	.0505	.0531	.0552	
20.	.0320	.0262	.0284	.0308	.0332	.0356	.0379	.0401	.0424	.0453	.0481	.0505	
21.	.0285	.0232	.0253	.0274	.0295	.0316	.0338	.0360	.0385	.0403	.0424	.0446	
22.	.0254	.0207	.0225	.0244	.0263	.0282	.0300	.0320	.0349	.0375	.0399	.0419	
23.	.0226	.0185	.0201	.0218	.0235	.0252	.0268	.0285	.0303	.0321	.0338	.0356	
24.	.0201	.0164	.0179	.0194	.0209	.0224	.0238	.0256	.0274	.0292	.0310	.0328	
25.	.0179	.0145	.0159	.0172	.0185	.0198	.0212	.0226	.0242	.0256	.0271	.0286	
26.	.0159	.0130	.0141	.0153	.0165	.0177	.0188	.0200	.0217	.0230	.0244	.0258	
27.	.0142	.0117	.0126	.0137	.0148	.0159	.0168	.0180	.0197	.0214	.0228	.0241	
28.	.0126	.0103	.0112	.0121	.0131	.0140	.0149	.0158	.0167	.0176	.0185	.0194	
29.	.0113	.0092	.0100	.0108	.0117	.0125	.0134	.0142	.0150	.0158	.0166	.0174	
30.	.0100	.0081	.0089	.0096	.0104	.0111	.0118	.0125	.0133	.0140	.0147	.0155	

PIPE & TUBING

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Pipe,
Tubing
Carbon,
Stainless

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SPECIFICATIONS

ASTM-A-53	Welded and Seamless Steel Pipe for Coiling and Bending
ASTM-A-83	Seamless Steel Boiler Tubes
ASTM-A-106	Seamless Carbon Steel Pipe for High Temperature Service
ASTM-A-120	Welded and Seamless Steel Pipe for Ordinary Uses
ASTM-A-178	Electric Resistance Welded Steel Boiler Tubes
ASTM-A-179	Seamless Cold Drawn Low Carbon Steel Heat Exchanger and Condenser Tubes
ASTM-A-214	Electric Resistance Welded Steel Heat Exchanger and Condenser Tubes
ASTM-A-269	Seamless and Welded Austenitic Stainless Steel Tubing Types 304, 321, 347, 316, 317
ASTM-A-270	Seamless and Welded Austenitic Stainless Steel Sanitary Tubing Type 304 Stainless Steel
ASTM-A-312	Stainless Steel Pipe
ASTM-A-335	Seamless Alloy Steel Pipe GR P-11 1 1/4% Chrome, 1/2% Moly GR P-22 2 1/4% Chrome, 1% Moly GR P-5C 5% Chrome, 1/2% Moly GR P-7 7% Chrome, 1/2% Moly GR P-9 9% Chrome, 1% Moly

CARBON AND STAINLESS STEEL TUBING AND PIPE SPECIFICATIONS (Cont.)

AMS SPECIFICATIONS

AMS-5075A	1025 Steel Airframe Tubing
AMS-5566B	Type 304 Stainless Steel Aircraft Quality $\frac{1}{8}$ Hard Hydraulic Tubing Both Seamless and Welded and Drawn
AMS-6371C	4130 Steel Aircraft Quality Mechanical Tubing
AMS-6372C	4135 Steel Aircraft Quality Mechanical Tubing
AMS-6415E	4340 Steel Aircraft Quality Mechanical Tubing

AN SPECIFICATIONS

AN-T-43 Comp. 1	Type 304 Stainless Steel Aircraft Quality Welded and Drawn Annealed Tubing
AN-T-43 Comp. 2	Type 321 and/or Type 347 Stainless Steel Aircraft Quality Welded and Drawn Annealed Tubing
AN-T-69	4130 Steel Airframe Tubing
AN-WW-T-850	4130 Steel Airframe Tubing
AN-WW-T-855	Type 304 Seamless Stainless Steel Aircraft Quality Tubing Annealed
AN-WW-T-858	Type 321 and/or Type 347 Seamless Stainless Steel Aircraft Quality Tubing Annealed

MILITARY SPECIFICATIONS

MIL-T-5066A	1025 Steel Airframe Tubing
MIL-T-6736	4130 Steel Airframe Tubing
MIL-T-6737	Type 321 and Type 347 Welded Stainless Steel Tubing
MIL-T-6845	Type 304 Stainless Steel Aircraft Quality $\frac{1}{8}$ Hard Hydraulic Tubing Both Seamless and Welded and Drawn
MIL-T-6846	Type 304 Stainless Steel Aircraft Quality Annealed Hydraulic Tubing Both Seamless and Welded and Drawn
MIL-T-8504	Type 304 Stainless Steel Aircraft Quality Annealed Hydraulic Tubing Both Seamless and Welded and Drawn
MIL-T-8606	Type 321 and Type 347 Stainless Steel Aircraft Quality Annealed Hydraulic Tubing Both Seamless and Welded and Drawn

FEDERAL SPECIFICATIONS

QQ-T-830 Cond. CDSR MT1015	Cold Drawn Seamless Steel Mechanical Tubing
QQ-T-830 Cond. W MT1010	Electric Resistance Welded Steel Mechanical Tubing
WW-T-731	Electric Resistance Welded Steel Boiler Tubes
WW-P-406	Continuous Weld and Seamless Steel Pipe

CONTINUOUS WELD STEEL PIPE

Standard and Extra Heavy

Specification ASTM-A-120-47

Pipe to this specification is intended for ordinary uses in steam, water, gas and air lines but is not intended for close coiling or bending, or high temperature service. Pipe ordered to SPEC. ASTM-A-120-47 is made to nominal dimensions with outside diameter variations plus or minus one percent and wall variations of plus nothing minus 12½ percent. No physical requirements are specified other than hydrostatic pressure tests which are made at the mills.

STOCKS

CONTINUOUS WELD STANDARD STEEL PIPE is carried both black and galvanized, both plain ends, threaded and coupled.

Black pipe has a tightly adhering coating applied at the mill to protect the metal from weathering.

Galvanized pipe has a zinc coating of full weight meeting both ASTM and AISI specifications.

Plain End Pipe is furnished with ends beveled 30 degrees for welding. Ends grooved for Victaulic Couplings can also be furnished.

Threaded and Coupled Pipe is furnished with standard taper pipe thread, $\frac{3}{4}$ -inch taper per foot. The length of threaded and coupled pipe is measured on the overall length including coupling.

CONTINUOUS WELD EXTRA HEAVY STEEL PIPE is stocked in plain ends only. Threaded and coupled extra Heavy Pipe can be made up in our shop. It has a tightly adhering coating applied at the mill to protect the metal from weathering.

CUTTING AND THREADING

We maintain a complete pipe shop equipped to cut and thread pipe from $\frac{1}{8}$ -inch through 12-inch. Sizes larger than 12-inch cut to length will be torch cut.

TYPES OF CUTS

Unless the type of cut is specified on the order confusion may result. If one of the following types is specified costly mistakes may be avoided.

ROLLER CUTS

A fast cut is made by a three wheel pipecutter. However the cutting action sets up a sizeable burr on the inside of the pipe at the cut.

ROLLER CUT REAMED AND CHAMFERED

After roller cutting a second operation of reaming the inside and chamfering the outside of the pipe may be performed, making a full finished cut.

THREADING

Unless otherwise specified all threads will be standard taper thread, $\frac{3}{4}$ -inch taper per foot. Straight pipe threads can be made when specified.

GROOVING

Grooves for Victaulic couplings can be made through 12-inches.

OTHER MATERIALS

Any of the operations shown above can be done on stainless steel, aluminum, copper and brass pipe.

CONTINUOUS WELD STEEL PIPE (Cont.)**Standard Steel Pipe — Spec. ASTM-A-120-47**

Black and Galvanized — Plain Ends or Threaded and Coupled

Single Random Lengths — 21 Feet

Nom. Size, Inches	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness Dec. In.	Approx. Wt.		No. of Threads per In.	Mill Test PSI
				Plain End	Threaded & Coupled		
1/8	.405	.269	.068	.24	.24	27	700
1/4	.540	.364	.088	.42	.42	18	700
3/8	.675	.493	.091	.57	.57	18	700
1/2	.840	.622	.109	.85	.85	14	700
5/8	1.050	.824	.113	1.13	1.13	14	700
1	1.315	1.049	.133	1.68	1.68	11 1/2	700
1 1/4	1.660	1.380	.140	2.27	2.28	11 1/2	800
1 1/2	1.900	1.610	.145	2.72	2.73	11 1/2	800
2	2.375	2.067	.154	3.65	3.68	11 1/2	800
2 1/2	2.875	2.469	.203	5.79	5.82	8	800
3	3.500	3.068	.216	7.58	7.62	8	800
3 1/2	4.000	3.548	.226	9.11	9.20	8	1200
4	4.500	4.026	.237	10.79	10.89	8	1200
5	5.563	5.047	.258	—	14.62	8	1200
6	6.625	6.065	.280	—	18.97	8	1200

†Galvanized only — 6 inch is seamless to Spec. ASTM-A-53

Extra Heavy Steel Pipe — Spec. ASTM-A-120-47

Black — Plain Ends

Single Random Lengths — 21 Feet

Nom. Size, Inches	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness Dec. In.	Approx. Wt. Lbs. per Ft.	Mill Test PSI
1/8	.405	.215	.095	.31	850
1/4	.540	.302	.119	.54	850
3/8	.675	.423	.126	.74	850
1/2	.840	.546	.147	1.09	850
5/8	1.050	.742	.154	1.47	850
1	1.315	.957	.179	2.17	850
1 1/4	1.660	1.278	.191	3.00	1100
1 1/2	1.900	1.500	.200	3.63	1100
2	2.375	1.939	.218	5.02	1100
2 1/2	2.875	2.323	.276	7.66	1100
3	3.500	2.900	.300	10.25	1100
3 1/2	4.000	3.364	.318	12.51	1700
4	4.500	3.826	.337	14.98	1700

Approximate Number of Feet and Weight per Bundle.

Size, inches	1/8	1/4	3/8	1/2	5/8	1	1 1/4	1 1/2
Pieces	30	24	18	12	7	5	3	3
Feet	630	504	378	252	147	105	63	63
Std. Wt., Lbs.	151	212	215	214	166	176	144	172
Ex-Hvy. Wt., Lbs.	195	272	280	275	216	228	189	229

The permissible variation in weight is 5 per cent above and 5 per cent below.

Standard Steel Pipe — Spec. ASTM-A-53

Black — Plain Ends

Double Random Lengths — 35 to 44 Feet

Has the advantage of guaranteed minimum physical values not offered by ASTM-A-120. These are:

Ultimate Tensile Strength Minimum..... 45,000 PSI

Yield Point Minimum..... 25,000 PSI

Nom. Size, Inches	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness Dec. In.	Approx. Wt. Lbs. per Ft.
2 1/2	2.875	2.469	.203	5.79
3	3.500	3.068	.216	7.58
3 1/2	4.000	3.548	.226	9.11
4	4.500	4.026	.237	10.79

WELDED AND SEAMLESS STEEL PIPE

Spec. ASTM-A-53 Grade B & †ASTM-A-106 Grade B

Pipe produced to ASTM-A-53 is intended for coiling, bending, flanging and other special purposes and has excellent welding properties.

Pipe produced to ASTM-A-106 is for high temperature service.

Minimum physical requirements:

Ultimate Tensile Strength Minimum.....	60,000 PSI
Yield Point Minimum.....	35,000 PSI
Elongation in 2-inches Minimum.....	30%

Wall thickness dimensions are nominal and will not measure less than 12½ per cent under specified wall thickness.

Nom. Size, Inches	Schedule	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
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ELECTRIC RESISTANCE WELDED BLACK STEEL PIPE

Spec. ASTM-A-53 Grade B

Random Lengths — Plain Ends Beveled for Welding

5	40 (Std.).....	5.563.....	5.047.....	.258.....	14.61
6	40 (Std.).....	6.625.....	6.065.....	.280.....	18.97
8	30 (Std.).....	8.625.....	8.071.....	.277.....	24.69
	40 (Std.).....		7.981.....	.322.....	28.55
10	(Std.).....	10.750.....	10.192.....	.279.....	31.20
	30 (Std.).....		10.136.....	.307.....	34.24
	40 (Std.).....		10.020.....	.365.....	40.48
12	30 (Std.).....	12.750.....	12.090.....	.330.....	43.77
	(Std.).....		12.000.....	.375.....	49.56

SEAMLESS BLACK STEEL PIPE

Specs. ASTM-A-53 Grade B & †ASTM-A-106 Grade B

Random Lengths — Plain Ends Beveled for Welding

2	40 (Std.).....	2.375.....	2.067.....	.154.....	3.65
	80 (X Stg.).....		1.937.....	.218.....	5.02
	(XX Stg.).....		1.503.....	.436.....	9.03
2½	40 (Std.).....	2.875.....	2.469.....	.203.....	5.79
	80 (X Stg.).....		2.323.....	.276.....	7.66
	(XX Stg.).....		1.771.....	.552.....	13.69
3	40 (Std.).....	3.500.....	3.068.....	.216.....	7.58
	80 (X Stg.).....		2.900.....	.300.....	10.25
	(XX Stg.).....		2.300.....	.600.....	18.58
3½	40 (Std.).....	4.000.....	3.548.....	.226.....	9.11
	80 (X Stg.).....		3.364.....	.318.....	12.50
4	40 (Std.).....	4.500.....	4.026.....	.237.....	10.79
	80 (X Stg.).....		3.826.....	.337.....	14.98
	(XX Stg.).....		3.152.....	.674.....	27.54
5	40 (Std.).....	5.563.....	5.049.....	.258.....	14.62
	80 (X Stg.).....		4.813.....	.375.....	20.78
	(XX Stg.).....		4.063.....	.750.....	38.55
6	40 (Std.).....	6.625.....	6.065.....	.280.....	18.97
	80 (X Stg.).....		5.761.....	.432.....	28.57
	(XX Stg.).....		4.897.....	.864.....	53.16
8	20.....	8.625.....	8.125.....	.250.....	22.36
	30 (Std.).....		8.071.....	.277.....	24.70
	40 (Std.).....		7.981.....	.322.....	28.55
	80 (X Stg.).....		7.625.....	.500.....	43.39
	(XX Stg.).....		6.875.....	.875.....	72.42
10 ...	20.....	10.750.....	10.250.....	.250.....	28.04
	(Std.).....		10.192.....	.279.....	31.20
	30 (Std.).....		10.136.....	.307.....	34.24
	40 (Std.).....		10.020.....	.365.....	40.48
	60 (X Stg.).....		9.750.....	.500.....	54.74
	140.....		8.750.....	1.000.....	104.1
	†160.....		8.500.....	1.125.....	115.7

(Continued on Page 100)

100 DUCOMMUN METALS & SUPPLY CO.

SEAMLESS BLACK STEEL PIPE (Cont.)

Specs. ASTM-A-53 Grade B & †ASTM-A-106 Grade B

Random Lengths — Plain Ends Beveled for Welding

Nom. Size, Inches	Schedule	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
12	20.....	12.750.....	12.250.....	.250.....	33.38
	30 (Std.).....		12.090.....	.330.....	43.77
	(Std.).....		12.000.....	.375.....	49.56
	(X Stg.).....		11.750.....	.500.....	65.42
	†120.....		10.750.....	1.000.....	125.5
14	10.....	14.000.....	13.500.....	.250.....	36.71
	20.....		13.375.....	.313.....	45.68
	30 (Std.).....		13.250.....	.375.....	54.57
	† (X Stg.).....		13.000.....	.500.....	72.09
	† 80.....		12.500.....	.750.....	106.1
16	10.....	16.000.....	15.500.....	.250.....	42.05
	20.....		15.375.....	.313.....	52.36
	30 (Std.).....		15.250.....	.375.....	62.50
	40 (X Stg.).....		15.000.....	.500.....	82.77
	†100.....		13.938.....	1.031.....	164.8
18	10.....	18.000.....	17.500.....	.250.....	47.39
	(Std.).....		17.250.....	.375.....	70.59
	† (X Stg.).....		17.000.....	.500.....	93.45
	† 60.....		16.500.....	.750.....	138.2
20	20 (Std.).....	20.000.....	19.250.....	.375.....	78.60
	† 30 (X Stg.).....		19.000.....	.500.....	104.1
	† 80.....		17.938.....	1.031.....	208.9
24	.....	24.000.....	23.375.....	.313.....	79.06
	20 (Std.).....		23.250.....	.375.....	94.62
	† (X Stg.).....		23.000.....	.500.....	125.5

SEAMLESS STEEL PRESSURE TUBING

Spec. ASTM-A-106 Grade B

Iron Pipe Sizes — Cold Drawn and †Hot Finished

Random Lengths — 17 to 24 Feet

Nom. Size Inches	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness per Lin. Ft.	Nom. Size Inches	O.D. Dec. In.	I.D. Dec. In.	Wall Thickness per Lin. Ft.		
1/8 ..	.405 ..	.269 ..	.068 ..	.2447	† 3/4 ..	1.050 ..	.824 ..	.113 ..	1.131

STANDARD WEIGHT — SCHEDULE 40

1/8 ..	.405 ..	.215 ..	.095 ..	.3145	† 3/4 ..	1.050 ..	.742 ..	.154 ..	1.474
1/4 ..	.540 ..	.364 ..	.088 ..	.4248	† 1 ..	1.315 ..	1.049 ..	.133 ..	1.679
3/8 ..	.675 ..	.493 ..	.091 ..	.5676	† 1 1/4 ..	1.660 ..	1.380 ..	.140 ..	2.273
1/2 ..	.840 ..	.622 ..	.109 ..	.8510	† 1 1/2 ..	1.900 ..	1.610 ..	.145 ..	2.718

EXTRA HEAVY — SCHEDULE 80

1/8 ..	.405 ..	.215 ..	.095 ..	.3145	† 3/4 ..	1.050 ..	.742 ..	.154 ..	1.474
1/4 ..	.540 ..	.302 ..	.119 ..	.5351	† 1 ..	1.315 ..	.957 ..	.179 ..	2.172
3/8 ..	.675 ..	.423 ..	.126 ..	.7388	† 1 1/4 ..	1.660 ..	1.278 ..	.191 ..	2.997
1/2 ..	.840 ..	.546 ..	.147 ..	1.088	† 1 1/2 ..	1.900 ..	1.500 ..	.200 ..	3.631

SCHEDULE 160

1/2 ..	.840 ..	.466 ..	.187 ..	1.304	† 1 1/4 ..	1.660 ..	1.160 ..	.250 ..	3.765
3/4 ..	1.050 ..	.614 ..	.218 ..	1.937	† 1 1/2 ..	1.900 ..	1.338 ..	.281 ..	4.859
† 1 ..	1.315 ..	.815 ..	.250 ..	2.844					

DOUBLE EXTRA STRONG

1/2 ..	.840 ..	.252 ..	.294 ..	1.714	1 1/4 ..	1.660 ..	.896 ..	.382 ..	5.214
3/4 ..	1.050 ..	.734 ..	.308 ..	2.441	1 1/2 ..	1.900 ..	1.100 ..	.400 ..	6.408
1 ..	1.315 ..	.599 ..	.358 ..	3.659					

SHELBY SEAMLESS STEEL MECHANICAL TUBING INFORMATION

We can furnish from mill on special order, in commercial quantities, various tempers, unusual sizes and special shapes in various grades of steel both Cold Drawn and Hot Finished. Some of the items available are:

"Soft Annealed" Tubes are Cold Drawn and Soft Annealed with surface free from scale. These tubes are suitable for most cold forming operations but are not desirable for users requiring smooth surfaces.

"Hot Finished" Tubes are slightly scaly and subject to wider tolerances than Cold Drawn. Will withstand an unusual amount of manipulating such as expanding, swaging, bending, upsetting and flanging. May frequently be used instead of castings, forged parts and solid stock.

Seamless Steel Tubes may be readily twisted, threaded, machined, ground, swaged, coated, bent, coiled, upset, tempered, flanged, tapered, expanded or flattened.

Stocks are Cold Drawn Seamless Steel Tubes, half hard temper, suitable for parts requiring close tolerances, stiffness, moderate ductility, smooth finish and good machining properties; not recommended for cold forming.

Analysis

Carbon (Maximum) . . . . .	.25
Manganese . . . . .	.30-.60
Phosphorus (Maximum) . . . . .	.04
Sulphur (Maximum) . . . . .	.055

Physical Properties

	Half Hard Temper
Yield Point pounds per sq. inch	55,000
Ultimate strength pounds per sq. inch	75,000
Elongation in 2 inches	30%
Rockwell Hardness	B-70
Brinell Hardness	121

This table is given only as a general guide because physical properties vary according to the amount of cold drawing involved and also depend on whether the wall is relatively light or heavy.

Straightness

All mechanical tubing is furnished sufficiently straight to meet reasonable commercial requirements, but due to problems involved in straightening tubular sections, definite tolerances cannot be stated for all conditions. Exacting requirements for straightness should always be given and straightness limit on any particular requirement will be quoted.

Machining Allowances

Tubing of the proper size should be selected so that when all dimensions (O.D., I.D., and wall thickness) vary to extreme limits permitted by tolerances of that size, there still will be sufficient stock to insure proper cleaning up in machining.

SIZE AND WALL THICKNESS VARIATIONS SQUARE AND RECTANGULAR COLD-DRAWN TUBING

Largest Outside Dimension Across Flats, Inches	Wall Thickness Dec. Inch	Allowable Variation in Outside Dimensions, Including Convexity or Concavity, Plus or Minus	Allowable Variation of Wall Thickness, Plus or Minus
Under $\frac{3}{4}$	.065 & Lighter	.015"	10%
$\frac{3}{4}$	Heavier than .065	.010"	10%
Over $\frac{3}{4}$ to $1\frac{1}{4}$ inc.	All Thicknesses	.015"	10%
Over $1\frac{1}{4}$ to $2\frac{1}{2}$ inc.	All Thicknesses	.020"	10%
Over $2\frac{1}{2}$ to $3\frac{1}{2}$ inc.	.065 & Lighter	.030"	10%
Over $3\frac{1}{2}$ to $5\frac{1}{2}$ inc.	.083 & Heavier	.025"	10%
Over $5\frac{1}{2}$ to $7\frac{1}{2}$ inc.	All Thicknesses	.030"	10%
	All Thicknesses	1%	10%

(Continued on Page 102)

SHELBY SEAMLESS STEEL

MECHANICAL TUBING INFORMATION (Cont.)

Permissible Variation in the Diameters and Wall Thicknesses

of Round Cold Drawn Seamless Mechanical Tubing

Group	Size O.D., Inch	Permissible variation					
		Outside Diameter Inches		Inside Diameter Inches		Walls Thickness Per Cent	
		Over	Under	Over	Under	Over	Under
1	3/16 to 1/2 excl.	0.004	0.	*†	*†	*†	*†
2	1/2 to 1 1/2 excl.	0.005†	0.	†	0.	0.005*†	10*†
3	1 1/2 to 3 1/2 excl.	0.010†	0.	†	0.	0.010*	10*
4	3 1/2 to 5 1/2 excl.	0.015	0.	†	0.005*	0.015*	10*
5	5 1/2 to 8 excl. when wall is less than 5% of O.D.	0.030†	0.030†	0.035†	0.035†	10	10
6	5 1/2 to 8 excl. when wall is from 5% to 7.5% O.D.	0.020	0.020	0.025	0.025	10	10
7	5 1/2 to 8 excl. when wall is over 7.5% of O.D.	0.030	0.	0.015*	0.030*	10*	10*
8	8 to 10 3/4 incl. when wall is less than 5% of O.D.	0.045†	0.045†	0.050†	0.050†	10	10
9	8 to 10 3/4 incl. when wall is from 5% to 7.5% of O.D.	0.035	0.035	0.040	0.040	10	10
10	8 to 10 3/4 incl. when wall is over 7.5% of O.D.	0.045	0.	0.015*	0.040*	10*	10*

**Our stock ordered to O.D. and wall thickness tolerance only.
Inside tolerances may not conform.**

(*) For tubes with inside diameter less than 50 per cent of outside diameter or wall thickness more than 25 per cent of outside diameter, or with wall thickness over 1 1/4 in., or weighing more than 90 lbs. per ft. which cannot be successfully drawn over a mandrel, the inside diameter may vary over or under by an amount equal to 10 per cent of the wall thickness. The wall thickness may vary 12 1/2 per cent over or under that specified.

(†) For tubes with inside diameter less than 1/2 in. (or less than 5/8 in. when the wall thickness is more than 20 per cent of the outside diameter), which cannot be successfully drawn over a mandrel, the wall thickness may vary 15 per cent over or under that specified and the inside diameter will be governed by the outside diameter and wall thickness variations.

(‡) Tubing having a wall thickness less than 3 per cent of the outside diameter cannot be straightened properly without a certain amount of distortion. Consequently such tubes, while having an average outside diameter and inside diameter within the tolerances shown in Table, will require an ovality tolerance of 1/2 per cent over or under the nominal outside diameter and inside diameter, this being in addition to the tolerance indicated in the table.

SPECIAL NOTE:—Tolerances are applicable only to two dimensions (length excepted). Thus, if O.D. and wall are specified, the theoretical I.D. may not conform to published tolerances. If O.D. and I.D. are specified, the wall may not conform to published tolerances except that the mean or average wall (taking into account the permissible O.D. and I.D. tolerances) will not vary more than indicated under "Wall Tolerances."

Any tubes ordered O.D. and I.D. where tolerances must be held, must be obtained from the mill on special order.

**SHELBY ROUND SEAMLESS
STEEL MECHANICAL TUBING**

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 24 Feet

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.				
1/8 Inch Diam.											
24	.022	.081	.024	18	.049	.402	.236				
22	.028	.069	.029	17	.058	.384	.274				
20	.035	.055	.034	16	.065	.370	.302				
3/16 Inch Diam.											
24	.022	.144	.039	14	.083	.334	.370				
22	.028	.131	.048	13	.095	.310	.411				
20	.035	.117	.057	12	.109	.282	.455				
18	.049	.089	.073	11	.120	.260	.487				
17	.058	.072	.081	10	.134	.232	.524				
16	.065	.058	.085	5 1/2	.156	.187	.573				
14	.083	.022	.093	1/2 Inch Diam., Cont.							
1/4 Inch Diam.											
24	.022	.206	.054	24	.022	.519	.127				
22	.028	.194	.066	22	.028	.506	.160				
20	.035	.180	.080	20	.035	.492	.197				
18	.049	.152	.105	18	.049	.464	.269				
17	.058	.134	.119	17	.058	.447	.313				
16	.065	.120	.128	16	.065	.432	.346				
14	.083	.084	.148	14	.083	.396	.426				
13	.095	.060	.157	13	.095	.372	.475				
5/16 Inch Diam.											
24	.022	.268	.068	11	.120	.322	.568				
22	.028	.256	.085	5/8 Inch Diam.							
20	.035	.242	.104	22	.028	.569	.179				
18	.049	.214	.138	20	.035	.555	.221				
17	.058	.197	.158	18	.049	.527	.301				
16	.065	.182	.172	17	.058	.509	.351				
14	.083	.147	.204	16	.065	.495	.389				
13	.095	.122	.221	14	.083	.459	.481				
11	.120	.073	.247	13	.095	.435	.538				
3/8 Inch Diam.											
24	.022	.331	.083	12	.109	.407	.601				
22	.028	.319	.104	11	.120	.385	.647				
20	.035	.305	.127	10	.134	.357	.703				
18	.049	.277	.171	5 1/2	.156	.313	.781				
17	.058	.259	.196	5 1/2	.188	.250	.877				
16	.065	.245	.215	1 1/16 Inch Diam.							
14	.083	.209	.259	20	.035	.617	.244				
13	.095	.185	.284	18	.049	.589	.334				
12	.109	.157	.310	17	.058	.571	.390				
11	.120	.135	.327	16	.065	.557	.433				
7/16 Inch Diam.											
24	.022	.393	.098	14	.083	.521	.536				
22	.028	.381	.123	13	.095	.497	.602				
20	.035	.367	.151	11	.120	.447	.728				
18	.049	.339	.204	5 1/2	.156	.375	.886				
17	.058	.322	.235	5 1/2	.188	.312	1.004				
16	.065	.307	.259	3/4 Inch Diam.							
14	.083	.272	.315	22	.028	.694	.216				
13	.095	.247	.348	20	.035	.680	.267				
11	.120	.197	.408	18	.049	.652	.367				
1/2 Inch Diam.											
24	.022	.456	.112	17	.058	.634	.429				
22	.028	.444	.141	16	.065	.620	.476				
20	.035	.430	.174	14	.083	.584	.591				
				13	.095	.560	.665				
				12	.109	.532	.746				
				11	.120	.510	.807				
				10	.134	.482	.882				
				5 1/2	.156	.438	.990				
				5 1/2	.188	.375	1.128				
				5 1/2	.219	.312	1.242				
				5 1/2	.250	.250	1.335				

SHELBY ROUND SEAMLESS STEEL MECHANICAL TUBING (Cont.)

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 24 Feet

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.	Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
1 1/16 Inch Diam.							
24	.022	.769	.186	20	.035	.992	.384
22	.028	.756	.235	18	.049	.964	.531
20	.035	.742	.291	17	.058	.946	.622
18	.049	.714	.400	16	.065	.932	.693
17	.058	.697	.468	14	.083	.897	.869
16	.065	.682	.519	13	.095	.872	.982
14	.083	.647	.647	11	.120	.822	1.209
13	.095	.622	.729	5/32	.156	.750	1.511
12	.109	.594	.820	3/16	.188	.688	1.757
11	.120	.572	.888	7/32	.219	.625	1.974
5/32	.156	.500	1.095	1/4	.250	.563	2.171
3/16	.188	.437	1.255	5/16	.313	.437	2.507
7/8 Inch Diam.							
24	.022	.831	.200	22	.028	1.069	.328
22	.028	.819	.253	20	.035	1.055	.407
20	.035	.805	.314	18	.049	1.027	.563
18	.049	.777	.432	17	.058	1.009	.661
17	.058	.759	.506	16	.065	.995	.736
16	.065	.745	.562	14	.083	.959	.924
14	.083	.709	.702	13	.095	.935	1.045
13	.095	.685	.791	12	.109	.907	1.183
12	.109	.657	.892	11	.120	.885	1.288
11	.120	.635	.968	10	.134	.857	1.418
10	.134	.607	1.060	5/32	.156	.812	1.614
5/32	.156	.563	1.198	3/16	.188	.750	1.881
3/16	.188	.500	1.379	7/32	.219	.688	2.119
7/32	.219	.438	1.534	1/4	.250	.625	2.336
1/4	.250	.375	1.669	5/32	.281	.563	2.533
15/16 Inch Diam.							
22	.028	.881	.272	22	.028	1.131	.347
20	.035	.867	.338	20	.035	1.117	.431
18	.049	.839	.465	18	.049	1.090	.596
17	.058	.822	.545	16	.065	1.057	.780
16	.065	.807	.606	14	.083	1.022	.980
14	.083	.722	.758	13	.095	.997	1.109
13	.095	.748	.855	11	.120	.947	1.369
11	.120	.698	1.048	5/32	.156	.875	1.719
5/32	.156	.625	1.303	3/16	.188	.813	2.008
3/16	.188	.563	1.506	7/32	.219	.750	2.266
1 Inch Diam.							
24	.022	.956	.230	1/4	.250	.687	2.504
22	.028	.944	.291	1 1/4 Inch Diam.			
20	.035	.930	.361	22	.028	1.194	.365
18	.049	.902	.498	20	.035	1.180	.454
17	.058	.884	.584	18	.049	1.152	.629
16	.065	.870	.649	17	.058	1.134	.738
14	.083	.834	.813	16	.065	1.120	.823
13	.095	.810	.918	14	.083	1.084	1.034
12	.109	.782	1.037	13	.095	1.060	1.172
11	.120	.760	1.128	12	.109	1.032	1.328
10	.134	.732	1.239	11	.120	1.010	1.448
5/32	.156	.688	1.406	10	.134	.982	1.597
3/16	.188	.625	1.630	5/32	.156	.937	1.823
7/32	.219	.563	1.827	3/16	.188	.875	2.132
1/4	.250	.500	2.003	7/32	.219	.812	2.411
5/32	.281	.438	2.158	1/4	.250	.750	2.670
5/16	.313	.375	2.297	5/32	.281	.688	2.908
1 1/16 Inch Diam.							
22	.028	1.006	.310	5/16	.313	.625	3.132
				3/8	.375	.500	3.504

**SHELBY ROUND SEAMLESS
STEEL MECHANICAL TUBING (Cont.)**

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 24 Feet

Birm. Gage	Average Dec. In.	Nonimal Dec. In.	Approx. I.D. Lin. Ft.	Wt. Lbs. per Lin. Ft.
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1 1/16 Inch Diam.

22	.028	1.257	.384
20	.035	1.242	.477
18	.049	1.214	.662
16	.065	1.182	.866
14	.083	1.147	1.090
13	.095	1.122	1.236
11	.120	1.072	1.529
5/32	.156	1.000	1.928
3/16	.188	.937	2.259
7/32	.219	.875	2.559
1/4	.250	.812	2.838
9/32	.281	.750	3.097
5/16	.313	.688	3.343
3/8	.375	.562	3.757

1 1/8 Inch Diam.

22	.028	1.319	.403
20	.035	1.305	.501
18	.049	1.277	.694
17	.058	1.259	.815
16	.065	1.245	.909
14	.083	1.209	1.145
13	.095	1.185	1.299
12	.109	1.157	1.474
11	.120	1.135	1.608
10	.134	1.107	1.776
5/32	.156	1.062	2.031
3/16	.188	1.000	2.383
7/32	.219	.938	2.704
1/4	.250	.875	3.004
9/32	.281	.813	3.283
5/16	.313	.750	3.550
3/8	.375	.625	4.005
7/16	.438	.500	4.383

1 7/16 Inch Diam.

20	.035	1.367	.524
18	.049	1.339	.727
16	.065	1.307	.953
13	.095	1.247	1.363
11	.120	1.197	1.689
5/32	.156	1.125	2.136
3/16	.188	1.062	2.510
7/32	.219	1.000	2.851
1/4	.250	.937	3.172

1 1/2 Inch Diam.

22	.028	1.444	.440
20	.035	1.430	.548
18	.049	1.402	.759
17	.058	1.384	.893
16	.065	1.370	.996
14	.083	1.334	1.256
13	.095	1.310	1.426
12	.109	1.282	1.619
11	.120	1.260	1.769
10	.134	1.232	1.955
5/32	.156	1.187	2.239
3/16	.188	1.125	2.634
7/32	.219	1.062	2.996
1/4	.250	1.000	3.338
9/32	.281	.939	3.658
5/16	.313	.875	3.968

Birm. Gage	Average Dec. In.	Nonimal Dec. In.	Approx. I.D. Lin. Ft.	Wt. Lbs. per Lin. Ft.
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1 1/2 Inch Diam., Cont.

3/8	.375	.750	4.506
7/16	.438	.625	4.968
1/2	.500	.500	5.340

1 1/16 Inch Diam.

20	.035	1.493	.571
18	.049	1.456	.792
16	.065	1.432	1.040
11	.120	1.322	1.849
5/32	.156	1.250	2.344
3/16	.188	1.187	2.761
1/4	.250	1.062	3.506
7/16	.375	.812	4.758

1 1/8 Inch Diam.

20	.035	1.555	.594
18	.049	1.527	.825
17	.058	1.509	.970
16	.065	1.495	1.083
14	.083	1.459	1.367
13	.095	1.435	1.552
11	.120	1.385	1.929
10	.134	1.357	2.134

5/32	.156	1.312	2.447
3/16	.188	1.250	2.885
7/32	.219	1.187	3.289
1/4	.250	1.125	3.671
7/32	.281	1.063	4.033
5/16	.313	1.000	4.386
3/8	.375	.875	5.006
7/16	.438	.750	5.553

1/2	.500	.625	6.008
20	.035	1.680	.641
18	.049	1.652	.890
17	.058	1.634	1.048
16	.065	1.620	1.170
14	.083	1.584	1.478
13	.095	1.560	1.679
12	.109	1.532	1.910
11	.120	1.510	2.089
10	.134	1.482	2.313

5/32	.156	1.437	2.656
3/16	.188	1.375	3.136
7/32	.219	1.312	3.581
1/4	.250	1.250	4.005
7/32	.281	1.188	4.409
5/16	.313	1.125	4.804
3/8	.375	1.000	5.507
7/16	.438	.875	6.137

1/2	.500	.750	6.675
18	.049	1.777	.956
16	.065	1.745	1.257
13	.095	1.685	1.806
11	.120	1.635	2.249
5/32	.156	1.563	2.864
3/16	.188	1.500	3.387
7/32	.219	1.438	3.873
1/4	.250	1.375	4.339

7/16	.281	1.313	4.784
18	.049	1.777	.956
16	.065	1.745	1.257
13	.095	1.685	1.806
11	.120	1.635	2.249
5/32	.156	1.563	2.864
3/16	.188	1.500	3.387
7/32	.219	1.438	3.873
1/4	.250	1.375	4.339

SHELBY ROUND SEAMLESS STEEL MECHANICAL TUBING (Cont.)

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 27 Feet

Birm. Gage	Average Wall Dec. In.	Nominal Approx. Wt. I.D. Dec. In. Lbs. per Lin. Ft.	Birm. Gage	Average Wall Dec. In.	Nominal Approx. Wt. I.D. Dec. In. Lbs. per Lin. Ft.			
1 1/8 Inch Diam., Cont.								
5/16	.313	1.250 .5.222	13	.095	2.185 .2.313			
3/8	.375	1.125 .6.008	11	.120	2.135 .2.890			
7/16	.438	1.000 .6.722	5/32	.156	2.063 .3.697			
1/2	.500	.875 .7.343	3/16	.188	2.000 .4.391			
2 Inch Diam.								
20	.035	1.930 .7.35	7/32	.219	1.937 .5.043			
18	.049	1.902 .1.021	1/4	.250	1.875 .5.674			
16	.065	1.870 .1.343	9/32	.281	1.813 .6.284			
14	.083	1.834 .1.699	5/16	.313	1.750 .6.893			
13	.095	1.810 .1.933	3/8	.375	1.625 .8.010			
11	.120	1.760 .2.409	7/16	.438	1.500 .9.061			
10	.134	1.732 .2.670	1/2	.500	1.375 .10.01			
5/32	.156	1.687 .3.072	5/8	.625	1.125 .11.68			
3/16	.188	1.625 .3.638	2 1/2 Inch Diam.					
7/32	.219	1.562 .4.166	18	.049	2.402 .1.283			
1/4	.250	1.500 .4.673	16	.065	2.370 .1.690			
9/32	.281	1.438 .5.159	14	.083	2.334 .2.143			
5/16	.313	1.375 .5.639	13	.095	2.310 .2.440			
3/8	.375	1.250 .6.508	11	.120	2.260 .3.050			
7/16	.438	1.125 .7.307	10	.134	2.232 .3.386			
1/2	.500	1.000 .8.010	5/32	.156	2.187 .3.905			
5/8	.625	.750 .9.178	3/16	.188	2.125 .4.642			
3/4	.750	.500 .10.010	7/32	.219	2.063 .5.335			
2 1/8 Inch Diam.								
18	.049	2.030 .1.086	1/4	.250	2.000 .6.008			
16	.065	1.995 .1.430	9/32	.281	1.938 .6.659			
14	.083	1.959 .1.810	5/16	.313	1.875 .7.311			
13	.095	1.935 .2.060	3/8	.375	1.750 .8.511			
11	.120	1.885 .2.570	7/16	.438	1.625 .9.646			
5/32	.156	1.813 .3.281	1/2	.500	1.500 .10.68			
3/16	.188	1.750 .3.889	7/16	.563	1.375 .11.65			
7/32	.219	1.688 .4.458	5/8	.625	1.250 .12.52			
1/4	.250	1.625 .5.006	3/4	.750	1.000 .14.02			
9/32	.313	1.500 .6.057	2 5/8 Inch Diam.					
3/8	.375	1.375 .7.009	16	.065	2.495 .1.777			
7/16	.438	1.250 .7.892	13	.095	2.435 .2.567			
1/2	.500	1.125 .8.678	11	.120	2.385 .3.210			
2 1/4 Inch Diam.								
20	.035	2.180 .8.228	5/32	.156	2.313 .4.114			
16	.065	2.120 .1.517	3/16	.188	2.250 .4.893			
14	.083	2.084 .1.921	7/32	.219	2.188 .5.627			
13	.095	2.060 .2.186	1/4	.250	2.125 .6.341			
12	.109	2.032 .2.492	9/32	.281	2.063 .7.035			
11	.120	2.010 .2.730	5/16	.313	2.000 .7.729			
5/32	.156	1.937 .3.489	3/8	.375	1.875 .9.011			
3/16	.188	1.875 .4.140	7/16	.438	1.751 .10.23			
7/32	.219	1.813 .4.750	1/2	.500	1.625 .11.35			
1/4	.250	1.750 .5.340	5/8	.625	1.375 .13.35			
9/32	.281	1.688 .5.909	2 3/4 Inch Diam.					
5/16	.313	1.625 .6.475	16	.065	2.620 .1.864			
3/8	.375	1.500 .7.509	14	.083	2.584 .2.364			
7/16	.438	1.375 .8.476	13	.095	2.560 .2.694			
1/2	.500	1.250 .9.345	11	.120	2.510 .3.371			
5/8	.625	1.000 .10.850	5/32	.156	2.437 .4.322			
2 3/8 Inch Diam.								
16	.065	2.245 .1.604	3/16	.188	2.375 .5.144			
14	.083	2.209 .2.032	7/32	.219	2.312 .5.920			

**SHELBY ROUND SEAMLESS
STEEL MECHANICAL TUBING (Cont.)**

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 27 Feet

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
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2 1/4 Inch Diam., Cont.

1/2	.500	1.750	12.02
5/8	.625	1.500	14.18
3/4	.750	1.250	16.02

2 5/8 Inch Diam.

16	.065	2.745	1.951
13	.095	2.685	2.821
11	.120	2.635	3.531
5/32	.156	2.563	4.530
3/16	.188	2.500	5.395
7/32	.219	2.438	6.212
1/4	.250	2.375	7.009
9/32	.281	2.313	7.785
5/16	.313	2.250	8.564
3/8	.375	2.125	10.01
7/16	.438	2.000	11.40
1/2	.500	1.875	12.68
5/8	.625	1.625	15.02
3/4	.750	1.375	17.02

3 Inch Diam.

16	.065	2.870	2.037
14	.083	2.834	2.586
13	.095	2.810	2.947
12	.109	2.782	3.365
11	.120	2.760	3.691
10	.134	2.732	4.102
5/32	.156	2.687	4.738
3/16	.188	2.625	5.646
7/32	.219	2.563	6.505
1/4	.250	2.500	7.343
9/32	.281	2.437	8.160
5/16	.313	2.375	8.982
3/8	.375	2.250	10.51
7/16	.438	2.125	11.98
1/2	.500	2.000	13.35
5/8	.625	1.750	15.85
3/4	.750	1.500	18.02
7/8	.875	1.250	19.86
1	1.000	1.000	21.36

3 1/8 Inch Diam.

11	.120	2.885	3.851
5/16	.188	2.750	5.897
7/32	.219	2.687	6.797
1/4	.250	2.625	7.676
5/16	.313	2.501	9.400
3/8	.375	2.375	11.01
7/16	.438	2.250	12.57
1/2	.500	2.125	14.02
5/8	.625	1.875	16.69
3/4	.750	1.625	19.02

3 1/4 Inch Diam.

16	.065	3.120	2.211
13	.095	3.060	3.201
11	.120	3.010	4.011
5/32	.156	2.938	5.155
3/16	.188	2.875	6.148
1/4	.250	2.750	8.010

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Wt. Lbs. per Lin. Ft.
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3 1/4 Inch Diam., Cont.

5/32	.281	2.688	8.910
3/16	.313	2.625	9.818
7/32	.375	2.500	11.51
1/4	.438	2.375	13.15
1/2	.500	2.250	14.69
5/16	.563	2.125	16.16
3/8	.625	2.000	17.52
7/16	.750	1.750	20.03
1/2	.875	1.500	22.19
1	1.000	1.250	24.03

3 3/8 Inch Diam.

11	.120	3.135	4.172
5/32	.156	3.063	5.363
3/16	.188	3.000	6.399
1/4	.250	2.875	8.344
5/16	.313	2.749	10.24
3/8	.375	2.625	12.02
7/16	.438	2.500	13.74
1/2	.500	2.375	15.35
5/8	.625	2.125	18.36
3/4	.750	1.875	21.03

3 1/2 Inch Diam.

16	.065	3.370	2.385
13	.095	3.310	3.455
11	.120	3.260	4.332
5/32	.156	3.188	5.571
3/16	.188	3.125	6.650
7/32	.219	3.062	7.674
1/4	.250	3.000	8.678
5/16	.313	2.875	10.65
3/8	.375	2.750	12.52
7/16	.438	2.625	14.32
1/2	.500	2.500	16.02
5/8	.625	2.250	19.19
3/4	.750	2.000	22.03
7/8	.875	1.750	24.53
1	1.000	1.500	26.70

3 5/8 Inch Diam.

5/8	.375	2.875	13.02
7/16	.438	2.750	14.91

3 3/4 Inch Diam.

13	.095	3.560	3.708
11	.120	3.510	4.652
5/32	.156	3.438	5.988
3/16	.188	3.375	7.152
1/4	.250	3.250	9.345
5/16	.313	3.125	11.49
3/8	.375	3.000	13.52
7/16	.438	2.875	15.49
1/2	.500	2.750	17.36
5/8	.625	2.500	20.86
3/4	.750	2.250	24.03
7/8	.875	2.000	26.87
1	1.000	1.750	29.37

SHELBY ROUND SEAMLESS STEEL MECHANICAL TUBING (Cont.)

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 27 Feet

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.
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4 Inch Diam.

16	.065	3.870	2.732
13	.095	3.810	3.962
11	.120	3.760	4.973
5/8	.156	3.687	6.404
3/4	.188	3.625	7.654
7/8	.219	3.562	8.843
1/2	.250	3.500	10.01
5/16	.313	3.375	12.33
3/8	.375	3.250	14.52
7/16	.438	3.125	16.66
1/2	.500	3.000	18.69
9/16	.563	2.875	20.67
5/8	.625	2.750	22.53
3/4	.750	2.500	26.03
7/8	.875	2.250	29.20
1	1.000	2.000	32.04
1 1/4	1.250	1.500	36.71

4 1/8 Inch Diam.

1/4	2.50	3.625	10.35
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4 1/4 Inch Diam.

13	.095	4.060	4.216
11	.120	4.010	5.293
5/8	.156	3.938	6.821
3/4	.188	3.875	8.156
1/2	.250	3.750	10.68
5/16	.313	3.625	13.16
3/8	.375	3.500	15.52
7/16	.438	3.375	17.83
1/2	.500	3.250	20.03
5/8	.625	3.000	24.20
3/4	.750	2.750	28.04
7/8	.875	2.500	31.54
1	1.000	2.250	34.71

4 1/2 Inch Diam.

11	.120	4.260	5.613
5/8	.156	4.188	7.237
3/4	.188	4.125	8.658
7/8	.219	4.062	10.01
1/2	.250	4.000	11.35
5/16	.313	3.875	14.00
3/8	.375	3.750	16.52
7/16	.438	3.625	19.00
1/2	.500	3.500	21.36
5/16	.563	3.375	23.67
5/8	.625	3.250	25.87
3/4	.750	3.000	30.04
7/8	.875	2.750	33.38
1	1.000	2.500	37.38
1 1/4	1.250	2.000	43.39

4 5/8 Inch Diam.

3/8	.375	3.875	17.02
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4 3/4 Inch Diam.

13	.095	4.560	4.723
11	.120	4.510	5.934
5/8	.188	4.375	9.160

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.
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4 3/4 Inch Diam., Cont.

1/4	.250	4.250	12.02
5/16	.313	4.125	14.83
3/8	.375	4.000	17.52
7/16	.438	3.875	20.17
1/2	.500	3.750	22.70
5/8	.625	3.500	27.53
3/4	.750	3.250	32.04
7/8	.875	3.000	36.21
1	1.000	2.750	40.05

5 Inch Diam.

11	.120	4.760	6.25
5/8	.156	4.687	8.070
3/4	.188	4.625	9.662
1/2	.250	4.500	12.68
5/16	.313	4.375	15.67
3/8	.375	4.250	18.52
7/16	.438	4.125	21.34
1/2	.500	4.000	24.03
5/8	.625	3.750	29.20
3/4	.750	3.500	34.04
7/8	.875	3.250	38.55
1	1.000	3.000	42.72
1 1/4	1.250	2.500	50.06
1 1/2	1.500	2.000	56.07

5 1/8 Inch Diam.

3/8	.375	4.375	19.02
11	.120	5.010	6.575
5/8	.188	4.875	10.16
1/2	.250	4.750	13.35
5/16	.313	4.624	16.50
3/8	.375	4.500	19.52
1/2	.500	4.250	25.37
5/8	.625	4.000	30.87
3/4	.750	3.750	36.05
7/8	.875	3.500	40.88
1	1.000	3.250	45.39

5 1/2 Inch Diam.

3/8	.375	5.125	10.67
1/2	.500	5.000	14.02
5/16	.313	4.875	17.34
3/8	.375	4.750	20.53
7/16	.438	4.625	23.68
1/2	.500	4.500	26.70
5/8	.625	4.250	32.54
3/4	.750	4.000	38.05
1	1.000	3.500	48.06
1 1/2	1.500	2.500	64.08

5 3/4 Inch Diam.

3/8	.375	5.375	11.17
1/2	.500	5.250	14.69
5/16	.313	5.125	18.18
3/8	.375	5.000	21.53
7/16	.500	4.750	28.04

**SHELBY ROUND SEAMLESS
STEEL MECHANICAL TUBING (Cont.)**

Cold Drawn — AISI-MT-1015

Outside Diameters — Birmingham (Stubs') Gage

Random Lengths up to 27 Feet

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.	Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.				
5 3/4 Inch Diam., Cont.											
5/8	.625	4.500	34.21	1	1.000	5.000	64.08				
3/4	.750	4.250	40.05	+1 1/4	1.250	4.500	76.76				
7/8	.875	4.000	45.56	+1 1/2	1.500	4.000	88.11				
1	1.000	3.750	50.73	7 Inch Diam., Cont.							
6 Inch Diam.											
1/8	.125	5.750	7.54	3/8	.375	6.500	27.53				
3/16	.188	5.625	11.67	1/2	.500	6.250	36.05				
1/4	.250	5.500	15.35	7/16	.750	5.750	52.07				
3/8	.375	5.250	22.53	7 1/2 Inch Diam.							
1/2	.500	5.000	29.37	1/4	.250	7.000	19.36				
5/8	.625	4.750	35.88	3/8	.375	6.750	28.54				
3/4	.750	4.500	42.05	1/2	.500	6.500	37.38				
7/8	.875	4.250	47.89	5/8	.625	6.250	45.89				
1	1.000	4.000	53.40	3/4	.750	6.000	54.07				
1 1/8	1.125	3.750	58.57	1	1.000	5.500	69.42				
+1 1/4	1.250	3.500	63.41	+1 1/2	1.500	4.500	96.12				
+1 1/2	1.500	3.000	72.09	7 3/4 Inch Diam.							
6 1/4 Inch Diam.											
3/16	.188	5.875	12.17	1/4	.250	7.250	20.03				
1/4	.250	5.750	16.02	3/8	.375	7.000	29.54				
5/16	.313	5.625	19.85	1/2	.500	6.750	38.72				
3/8	.375	5.500	23.53	7/16	.750	6.250	56.07				
1/2	.500	5.250	30.71	1	1.000	5.750	72.09				
5/8	.625	5.000	37.55	+1 1/4	1.250	5.250	86.78				
3/4	.750	4.750	44.06	8 Inch Diam.							
1	1.000	4.250	56.07	3/16	.188	7.625	15.69				
+1 1/4	1.250	3.750	66.75	1/4	.250	7.500	20.69				
6 1/2 Inch Diam.											
3/16	.188	6.125	12.67	3/8	.375	7.250	30.54				
1/4	.250	6.000	16.69	1/2	.500	7.000	40.05				
3/8	.375	5.750	24.53	5/8	.750	6.500	58.07				
1/2	.500	5.500	32.04	1	1.000	6.000	74.76				
5/8	.625	5.250	39.22	+1 1/2	1.500	5.000	104.10				
3/4	.750	5.000	46.06	8 1/4 Inch Diam.							
1	1.000	4.500	58.74	1/2	.500	7.250	41.39				
+1 1/4	1.250	4.000	70.09	8 1/2 Inch Diam.							
+1 1/2	1.500	3.500	80.10	1/4	.250	8.000	22.03				
6 3/4 Inch Diam.											
1/4	.250	6.250	17.36	3/8	.375	7.750	32.54				
3/8	.375	6.000	25.53	1/2	.500	7.500	42.72				
1/2	.500	5.750	33.38	3/4	.750	7.000	62.08				
5/8	.625	5.500	40.88	1	1.000	6.500	80.10				
3/4	.750	5.250	48.06	+1 1/4	1.250	6.000	96.79				
1	1.000	4.750	61.41	+1 1/2	1.500	5.500	112.10				
+1 1/4	1.250	4.250	73.43	8 3/4 Inch Diam.							
7 Inch Diam.											
1/4	.250	6.500	18.02	1/2	.500	7.750	44.06				
3/8	.375	6.250	26.53	3/4	.750	7.250	64.08				
1/2	.500	6.000	34.71	1	1.000	6.750	82.77				
5/8	.625	5.750	42.55	9 Inch Diam.							
3/4	.750	5.500	50.06	3/16	.188	8.625	17.69				

†Hot Finished.

SHELBY ROUND SEAMLESS**STEEL MECHANICAL TUBING (Cont.)**

**Cold Drawn — AISI-MT-1015 — Random Lengths up to 27 Feet
Outside Diameters — Birmingham (Stubs') Gage**

Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.	Birm. Gage	Average Wall Dec. In.	Nominal I.D. Dec. In.	Approx. Lbs. per Lin. Ft.				
9½ Inch Diam.											
¼	.250	9.000	24.70	¼	.250	10.000	27.37				
⅜	.375	8.750	36.55	⅜	.375	9.750	40.55				
½	.500	8.500	48.06	½	.500	9.500	53.40				
¾	.750	8.000	70.09	¾	.750	9.000	78.10				
1	1.000	7.500	90.78	†1	1.000	8.500	101.50				
†1½	1.500	6.500	110.10	10½ Inch Diam.							
9¾ Inch Diam.											
⅜	.375	9.000	37.55	†1½	1.500	7.750	148.20				
½	.500	8.750	49.40	†1¾	1.750	7.250	168.20				
¾	.750	8.250	72.09	†2	2.000	6.750	186.90				
1	1.000	7.750	93.45	10 Inch Diam.							
¼	.250	9.500	26.03	½	.500	10.000	56.07				
⅜	.375	9.250	38.55	¾	.750	9.500	82.10				
½	.500	9.000	50.73	1	1.000	9.000	106.80				
⅝	.625	8.750	62.58	11 Inch Diam.							
¾	.750	8.500	74.09	¼	.250	11.500	31.37				
†1	1.000	8.000	96.12	½	.500	11.000	61.41				
†1¼	1.250	7.500	116.80	¾	.750	10.500	90.11				
†2	2.000	6.000	170.90	1	1.000	10.000	117.50				

ROUND — WELDED AND DRAWN OVER MANDREL (WDOM) CARBON STEEL MECHANICAL TUBING

Stock Lengths — 20 Ft. 6 In. to 27 Ft. 6 In. Random

O.D. Inch	Birm. Gage	Wall Thick- ness In.	Approx. Wt. Lbs. per Lin. Ft.	O.D. Inch	Birm. Gage	Wall Thick- ness In.	Approx. Wt. Lbs. per Lin. Ft.		
½	20	.035	.430	.174	2½	¾"	.188	1.875	4.140
	18	.049	.402	.236		¼"	.250	1.750	5.340
	16	.065	.370	.302	2½	⅛"	.125	2.250	3.171
⅝	18	.049	.527	.301		¾"	.188	2.125	4.642
	16	.065	.495	.389		¼"	.250	2.000	6.008
¾	18	.049	.652	.367	2¾	⅛"	.125	2.500	3.504
	16	.065	.620	.476		¼"	.250	2.250	6.675
	13	.095	.560	.665	3	⅛"	.125	2.750	3.838
	⅞"	.125	.500	.834		¾"	.188	2.625	5.646
1	18	.049	.902	.498		¼"	.250	2.500	7.343
	16	.065	.870	.649	3½	⅛"	.125	3.250	4.506
	13	.095	.810	.918		¾"	.188	3.125	6.650
	⅞"	.125	.750	1.168		¼"	.250	3.000	8.678
1¼	16	.065	1.120	.823	4	⅛"	.125	3.750	5.173
	⅞"	.125	1.000	1.502		¾"	.188	3.625	7.654
	⅜"	.188	.875	2.132		¼"	.250	3.500	10.01
1¾	16	.065	1.245	.909	4½	⅛"	.125	4.250	5.84
1½	13	.095	1.310	1.426		¼"	.250	4.000	11.35
	⅞"	.125	1.250	1.836	5	⅛"	.125	4.750	6.50
	⅜"	.188	1.125	2.634		¾"	.188	4.625	9.66
1½	13	.095	1.435	1.552		¼"	.250	4.500	12.68
	⅞"	.125	1.375	2.003	5½	⅜"	.188	5.125	10.67
1¾	⅞"	.125	1.500	2.169		¼"	.250	5.500	14.02
	⅜"	.188	1.375	3.136	6	⅜"	.188	5.625	11.67
2	⅞"	.125	1.750	2.503		¼"	.250	5.500	15.35
	⅜"	.188	1.625	3.638		½"	.250	6.000	16.69
	¼"	.250	1.500	4.673	6½	¼"	.250	6.500	18.02
2½	⅞"	.125	2.000	2.837	7	¼"	.250	6.500	

†Hot Finished.

ELECTRIC WELDED ROUND STEEL TUBING

Mechanical Grade

Outside Diameters — Birmingham (Stubs') Gage

Cold Rolled and Hot Rolled, Pickled and Oiled

Stock Lengths { Lighter than .083" Wall Thickness, 20 Feet.
 .083" Wall Thickness & Heavier, 24 Feet.

O.D. Inch	Wall Thick- ness				Approx. Wt. Lbs. per Lin. Ft.		O.D. Inch	Wall Thick- ness				Approx. Wt. Lbs. per Lin. Ft.	
	Birm. Gage	Dec. In.	I.D. Dec. In.	per Lin. Ft.	Birm. Gage	Dec. In.	I.D. Dec. In.	per Lin. Ft.					
3/8	22	.028	.319	.104	1 3/4	14	.083	1.584	1.478				
	20	.035	.305	.127		13	.095	1.560	1.679				
	18	.049	.277	.171	1 7/8	18	.049	1.777	.956				
	14	.083	.209	.259		16	.065	1.745	1.257				
7/16	14	.083	.271	.314		14	.083	1.709	1.589				
1/2	20	.035	.430	.174	2	20	.035	1.930	.735				
	18	.049	.402	.236		18	.049	1.902	1.021				
	16	.065	.370	.302		16	.065	1.870	1.343				
	14	.083	.334	.369		14	.083	1.834	1.699				
5/16	14	.083	.396	.425		11	.120	1.760	2.409				
5/8	22	.028	.569	.179	2 1/8	18	.049	2.027	1.086				
	20	.035	.555	.221		16	.065	1.995	1.430				
	18	.049	.527	.301	2 1/4	18	.049	2.152	1.152				
	16	.060	.505	.362		16	.065	2.120	1.517				
	14	.083	.459	.481	2 3/8	16	.065	2.245	1.604				
3/4	22	.028	.694	.216		11	.120	2.135	2.890				
	20	.035	.680	.267	2 1/2	18	.049	2.402	1.283				
	18	.049	.652	.367		16	.065	2.370	1.690				
	16	.060	.630	.442		14	.083	2.334	2.586				
7/8	20	.035	.805	.314		11	.120	2.260	3.050				
	18	.049	.777	.432	2 5/8	18	.049	2.527	1.348				
	16	.060	.755	.522		2 3/4	18	.049	2.652	1.413			
	14	.083	.709	.702		16	.065	2.620	1.864				
1	20	.035	.930	.361	3	18	.049	2.902	1.544				
	18	.049	.902	.498		16	.065	2.870	2.037				
	16	.060	.880	.602		14	.083	2.834	2.586				
	14	.083	.834	.813		13	.095	2.810	2.947				
	11	.120	.760	1.128		12	.109	2.782	3.365				
1 1/8	20	.035	1.055	.407		11	.120	2.760	3.691				
	18	.049	1.027	.563	3 1/4	16	.065	3.120	2.211				
	16	.065	.995	.736		13	.095	3.060	3.201				
1 1/4	20	.035	1.180	.454	3 1/2	16	.065	3.370	2.385				
	18	.049	1.152	.629		11	.120	3.260	4.332				
	16	.060	1.130	.763		1/4"	.250	3.000	8.678				
	14	.083	1.084	1.034	3 3/4	16	.065	3.620	2.558				
	13	.095	1.060	1.172	4	16	.065	3.870	2.732				
1 3/8	18	.049	1.277	.694		14	.083	3.834	3.472				
	16	.065	1.245	.909		13	.095	3.810	3.962				
1 1/2	20	.035	1.430	.548		11	.120	3.760	4.973				
	18	.049	1.412	.759		1/4"	.250	3.500	10.010				
	16	.065	1.370	.996	4 1/2	16	.065	4.370	3.079				
	14	.083	1.334	1.256		13	.095	4.310	4.469				
	13	.095	1.310	1.426		11	.120	4.260	5.613				
1 5/8	20	.035	1.555	.594	5	16	.065	4.870	3.426				
	18	.049	1.527	.825		11	.120	4.760	6.254				
	16	.060	1.505	1.003		1/4"	.250	4.500	12.680				
1 3/4	20	.035	1.680	.641	6	16	.065	5.870	4.120				
	18	.049	1.652	.890		11	.120	5.760	7.536				
	16	.060	1.630	1.083		1/4"	.250	5.500	15.350				

ELECTRIC WELDED STEEL TUBING**Cold Rolled and †Hot Rolled, Pickled and Oiled**

Stock Lengths { Lighter than .083" Wall Thickness, 20 Feet.
 .083" Wall Thickness & Heavier, 24 Feet.

Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.
SQUARE								
3/8	.049	.217	1 1/4	.060	.971	2 1/2	.065	2.152
1/2	.049	.301		†.083	1.317		†.083	2.728
	.060	.359		†.095	1.492		†.095	3.107
5/8	.049	.384		†.109	1.691		†.120	3.884
	.060	.461		†.120	1.844			
3/4	.049	.467	1 1/2	.060	1.175	3	.065	2.594
	.060	.563		†.083	1.600		†.083	3.292
	†.083	.753		†.095	1.815		†.095	3.753
7/8	.049	.550		†.109	2.062		†.120	4.699
	.060	.665		†.120	2.252		†.134	5.223
1	.049	.634	1 3/4	.065	1.490		†.220	8.317
	.060	.767		†.083	1.882			
	†.083	1.035		†.095	2.138	3 1/2	†.095	4.400
	†.095	1.169		†.109	2.432		†.120	5.516
	†.120	1.436		†.120	2.660		†.220	9.814
1 1/8	.049	.717	2	.060	1.583			
	.060	.869		†.083	2.164	4	†.083	4.421
1 1/4	.049	.799		†.095	2.461		†.120	6.332
				†.120	3.068		†.220	11.310

RECTANGULAR

1/2x1	.. .065 .. .606	1 x3	.. †.095 .. 2.461	1 1/2x3	.. †.134 .. 3.856
3/4x1 1/2	.. .065 .. .937	x3	.. †.120 .. 3.068	x4	.. †.120 .. 4.292
x1 1/2	.. †.083 .. 1.176	x3 1/2	.. .083 .. 2.446	2 x3	.. .065 .. 2.153
1 x1 1/2	.. .065 .. 1.048	1 1/2x2	.. †.083 .. 1.882	x3	.. †.083 .. 2.728
x1 1/2	.. †.083 .. 1.317	x2	.. †.095 .. 2.138	x3	.. †.095 .. 3.107
x1 1/2	.. †.095 .. 1.492	x2	.. †.120 .. 2.660	x3	.. †.120 .. 3.884
x1 1/2	.. †.120 .. 1.844	x2 1/2	.. †.083 .. 2.164	x4	.. .065 .. 2.594
x2	.. .065 .. 1.269	x2 1/2	.. †.095 .. 2.461	x4	.. †.083 .. 3.292
x2	.. †.083 .. 1.600	x2 1/2	.. †.120 .. 3.068	x4	.. †.095 .. 3.753
x2	.. †.095 .. 1.815	x3	.. †.083 .. 2.446	x4	.. †.120 .. 4.700
x2	.. †.120 .. 2.252	x3	.. †.095 .. 2.784	2 1/2x5	.. †.120 .. 5.924
x3	.. †.083 .. 2.164	x3	.. †.120 .. 3.476	x5	.. †.180 .. 8.739

SQUARE SEAMLESS STEEL MECHANICAL TUBING**Cold Drawn — AISI-MT-1015**

Random Lengths up to 24 Feet

O.D. Inch	Wall Dec. Inch	Approx. I.D.	Approx. Wt. Lbs. per Foot
1	.125	.750	1.488
1 1/4	.145	.960	2.179
1 1/2	.145	1.210	2.589
2	.145	1.710	3.658
2 1/2	.200	2.100	6.256
3	.200	2.600	7.616
4	.250	3.500	12.750

MILL SHIPMENTS

In addition to our complete warehouse service we are prepared to handle your tubing requirements direct from the mill at mill prices.

HOLLOW STRUCTURAL TUBING**HOT ROLLED CARBON STEEL****Spec. ASTM A-36****Stock Lengths 40 Feet Exact or 36 to 44 Feet Random**

Especially well-suited for architectural, structural, machinery and equipment applications where combined beauty and strength are needed. Cold formed from prime, blast cleaned steel sheets and plates and electric resistance-welded. Cold forming produces a finish ready for painting and clean and smooth enough for exposed applications.

Sections have flat sides, small corner radii, excellent torsional properties and high strength-to-weight ratios. They are easy to detail, fabricate, join and erect.

MECHANICAL PROPERTIES**Tensile Strength: 58,000 to 80,000 PSI****Yield Point: 36,000 PSI, Minimum****CHEMICAL COMPOSITION****Maximum Per Cent Analysis****Ladle Check**

Carbon.....	.26	.30
Phosphorus.....	.04	.05
Sulphur.....	.05	.063

SQUARE

Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.
1.....	.095.....	1.09	3.....	.120.....	4.70	6.....	$\frac{3}{16}$	14.41
	.120.....	1.44		.155.....	5.78		$\frac{1}{4}$	18.82
$1\frac{1}{4}$.....	.100.....	1.47		$\frac{3}{16}$	6.86		$\frac{5}{16}$	23.02
	.120.....	1.85		$\frac{1}{4}$	8.80		$\frac{3}{8}$	27.04
	$\frac{1}{16}$	1.96	$3\frac{1}{2}$.....	.156.....	6.88		$\frac{1}{2}$	34.48
	$\frac{1}{16}$	2.62		$\frac{3}{16}$	8.14	7.....	$\frac{3}{16}$	16.85
$1\frac{1}{2}$.....	.105.....	1.90		$\frac{1}{4}$	10.50		$\frac{1}{4}$	22.04
	.120.....	2.25		$\frac{5}{16}$	12.69		$\frac{5}{16}$	26.99
	$\frac{1}{16}$	2.50	4.....	$\frac{3}{16}$	9.31		$\frac{3}{8}$	31.73
	$\frac{3}{16}$	3.23		$\frac{1}{4}$	12.02		$\frac{1}{2}$	40.55
	$\frac{1}{16}$	4.12		$\frac{5}{16}$	14.52	8.....	$\frac{3}{16}$	19.70
2.....	.110.....	2.69		$\frac{3}{8}$	16.84		$\frac{1}{4}$	25.44
	.120.....	3.04		$\frac{1}{2}$	20.88		$\frac{5}{16}$	31.24
	$\frac{1}{16}$	3.51	$4\frac{1}{2}$	$\frac{3}{16}$	10.79		$\frac{3}{8}$	36.83
	$\frac{1}{16}$	3.65		$\frac{1}{4}$	14.08		$\frac{1}{2}$	47.35
	$\frac{5}{16}$	4.43		$\frac{3}{8}$	19.98		$\frac{5}{16}$	56.98
	$\frac{3}{16}$	4.31	5.....	$\frac{3}{16}$	11.86	9.....	$\frac{3}{16}$	22.40
	$\frac{1}{16}$	5.73		$\frac{1}{4}$	15.42		$\frac{1}{4}$	29.70
$2\frac{1}{2}$.....	.120.....	3.88		$\frac{5}{16}$	18.77		$\frac{5}{16}$	36.92
	.141.....	4.32		$\frac{3}{8}$	21.94		$\frac{3}{8}$	44.06
	$\frac{3}{16}$	5.59		$\frac{1}{2}$	27.68	10.....	$\frac{1}{4}$	32.23
	$\frac{5}{16}$	5.67	$5\frac{1}{2}$	$\frac{3}{16}$	13.68		$\frac{5}{16}$	39.74
	.203.....	6.34		$\frac{1}{4}$	18.02		$\frac{3}{8}$	47.03
	$\frac{1}{4}$	7.10		$\frac{5}{16}$	22.35		$\frac{1}{2}$	60.95
	$\frac{1}{16}$	7.29		$\frac{3}{8}$	26.53		$\frac{5}{8}$	73.98

Formed Pipe

HOLLOW STRUCTURAL TUBING**HOT ROLLED CARBON STEEL****Spec. ASTM A-36****Stock Lengths 40 Feet Exact or 36 to 44 Feet Random****RECTANGULAR**

Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.	Outside Dimen. Inches	Wall Thick. Dec. In.	App. Wt. Lbs. per Lin. Ft.
1 1/2 x 2 1/2	.120	3.04	3 x 6	3/8	19.39	5 x 6	3/8	26.53
	.145	3.51		1/2	24.28	5 x 7	3/16	14.41
	3/4	4.43	3 x 8	3/16	13.68		1/4	18.82
	5/16	5.73		1/4	18.02		5/16	23.03
2 x 3	.120	3.88		5/16	22.35		3/8	27.04
	.141	4.32		3/8	26.53		1/2	34.48
	3/16	5.59	3 x 9	3/16	14.41	5 x 9	3/16	16.85
	.203	6.34		1/4	18.82		1/4	22.04
	1/4	7.10		5/16	24.37		5/16	28.53
2 x 4	.120	4.70		3/8	27.04		3/8	31.73
	.155	5.78		1/2	34.48		1/2	40.55
	3/16	6.86	3 x 12	3/16	18.65	5 x 10	3/16	18.65
	1/4	8.80		1/4	24.70		1/4	24.70
2 x 5	.156	6.88		3/8	36.55		3/8	36.55
	3/16	8.14	4 x 5	3/16	10.79	6 x 8	3/16	16.85
	1/4	10.50		1/4	14.08		1/4	22.04
	5/16	12.69		3/8	19.98		5/16	26.99
2 x 6	3/16	9.31	4 x 6	3/16	11.86		3/8	31.73
	1/4	12.02		1/4	15.42		1/2	40.55
	3/8	16.84		5/16	18.77	6 x 9	3/16	18.65
2 x 8	3/16	11.86		3/8	21.94		1/4	24.70
	1/4	15.42		1/2	27.68		3/8	36.55
	3/8	21.94	4 x 7	3/16	13.68	6 x 10	3/16	19.70
2 x 9	3/16	13.68		1/4	18.02		1/4	25.44
	1/4	18.02		5/16	22.35		5/16	31.24
	5/16	22.35		3/8	26.53		3/8	36.83
	3/8	26.53	4 x 8	3/16	14.41		1/2	47.35
2 x 10	3/16	14.41		1/4	18.82	6 x 12	3/16	22.40
	1/4	18.82		5/16	23.02		1/4	29.70
	5/16	24.37		3/8	27.04		5/16	36.92
	3/8	27.04		1/2	34.48		3/8	44.06
	1/2	34.48	4 x 10	3/16	16.85	7 x 8	3/16	18.65
3 x 4	.156	6.88		1/4	22.04		1/4	24.70
	3/16	8.14		5/16	28.53		3/8	36.55
	1/4	10.50		3/8	31.73		1/2	47.35
	5/16	12.69		1/2	40.55	7 x 9	3/16	19.70
3 x 5	3/16	9.31	4 x 12	3/16	19.70		1/4	25.44
	1/4	12.02		1/4	25.44		5/16	32.38
	5/16	14.52		5/16	32.38		3/8	36.83
	3/8	16.84		3/8	36.83		1/2	47.35
	1/2	20.88		1/2	47.35	8 x 10	3/16	22.40
3 x 6	3/16	10.58	5 x 6	3/16	13.68		1/4	29.70
	1/4	13.72		1/4	18.02		5/16	36.92
	5/16	16.65		5/16	22.35		3/8	44.06

§Formed Pipe

ELECTRIC WELDED HYDRAULIC LINE TUBING

+ Spec. HL-1 — Ends Protected with Plastic Caps

Certified to J.I.C. Standards on Applicable Sizes

Made from prime, flat-rolled carbon steel. Electric-resistance method of welding, without the addition of filler material, insures weld penetration and relative freedom from surface defects and seams. Maximum hardness not to exceed 65 Rockwell, B Scale.

Annealed for easy bending in any plane and for flaring.

Inside of tubing is commercially bright, resulting from cold drawing over mandrels. Both inside and outside of tubing are coated with clean rust-resistant oil for protection of surfaces against corrosion during shipment and normal storage conditions. This oil can be readily removed, even after extended storage periods, with an alkaline solution or with Benzine (Stoddard Solvent).

Dimensional Tolerances

Chemical Composition	Size, Inches	Plus or Minus	
		O.D. Inch	I.D. Inch
Car. .18 Max.	3/8	.002	.005
Man. .30 to .60	Over 3/8 to 5/8	.0025	.0025
Phos. .050 Max.	Over 5/8 to 2	.003	.003
Sul. .055 Max.	Over 2 to 2 1/2	.004	.004

Tensile Strength Maximum..... 55,000 P.S.I.

Elongation in 2-inch Minimum..... 35%*

*For tubes with O.D. of 3/8-inch and less and/or wall thickness of .035 inch and less, a minimum elongation of 30% permitted.

+ Specification HL-1 results from the testing and adoption of this class of product by Ford Motor Company, in issuing their specification M 3A23 and General Motors Corporation specification GM137-M. In addition Vicker's, Inc., have also issued their specification 136.

Recommended Working Pressures (PSI) and Size Range

O.D. Inches	Wall Thickness, Inches									
	.035	.049	.065	.083	.095	.109	.120	.134	.148	.165
1/4	4200	5880	....	....	....	....	....	....	....	....
5/16	2800	3920	....	....	....	....	....	....	....	....
1/2	2100	2940	3900	....	....	....	....	....	....	....
9/16	1680	2360	3120	3990	....	....	....	....	....	....
5/8	....	1960	2600	3320	3800	....	....	....	....	....
7/8	....	....	2230	2850	3260	....	....	....	....	....
1	....	....	1950	2490	2850	3270	3600	....	....	....
1 1/4	....	....	....	2000	2280	2620	2880	....	....	....
1 1/2	....	....	....	....	1900	2180	2400	2680	....	....
1 3/4	....	....	....	....	....	1870	2060	2300	2540	....
2	....	....	....	....	....	....	1800	2010	2220	2480
2 1/2	....	....	....	....	....	....	....	1610	1780	1980

Above values computed from Barlow's Formula $P = \frac{2ST}{D}$

S = Fibre Stress of 15,000 PSI P = Pressure

D = Outside Diameter T = Wall Thickness

For approximate bursting pressures, multiply these values by 3.3.

Random Lengths — 20 Feet

O.D. Inch	Wall Thickness Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Length	O.D. Inch	Wall Thickness Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Length
1/4	.035	.180	.080... 1.16	3/4	.095	.560...	.665... 13.30
	.049	.152	.105... 2.10	7/8	.095	.685...	.791... 15.82
5/16	.035	.305	.127... 2.54	1	.065	.870...	.649... 12.98
	.049	.277	.171... 3.42		.095	.810...	.918... 18.36
1/2	.035	.430	.174... 3.48		.120	.760...	.1.128... 22.56
	.049	.402	.236... 4.72	1 1/4	.083	.1.084...	.1.034... 20.68
9/16	.065	.370	.302... 6.04		.095	.1.060...	.1.020... 20.40
	.049	.527	.301... 6.02		.120	.1.020...	.1.448... 28.96
5/8	.049	.652	.367... 7.34	1 1/2	.095	.1.310...	.1.426... 28.52
	.065	.620	.476... 9.52		.120	.1.260...	.1.769... 35.38
7/8	.083	.584	.591... 11.82				

ROUND OPEN SEAM STEEL TUBES**Stock Lengths 10 Feet**

O.D. Inch	B.W. Gage	Wall Thickness	Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.
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GALVANIZED STEEL

7/8	16	.065		.617
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18-8 TYPE 302 STAINLESS STEEL — 2B FINISH

1/2	20	.035		.174
3/4	18	.049		.367
7/8	18	.049		.432

SQUARE TYPE 302 STAINLESS STEEL**ELECTRIC WELDED TUBING****Stock Lengths — 20 Feet Random**

O.D. Inch	B.W. Gage	Wall Thickness	Dec. Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.
1	16	.064		.870	.826

ROUND POLISHED STAINLESS STEEL WELDED TUBING**Lengths Up To 20 Feet**

No. 180 grit polish is standard. It is similar to No. 4 finish on stainless steel sheets.

Nos. 80, 120, 240 grit, and buffed finishes also available on special order.

Not available in white pickle finish.

Furnished in following conditions:

Polished outside diameter only.

Polished inside diameter only.

Polished both outside and inside diameters.

Tubes polished on inside diameter are plugged to keep a clean inside surface.

Tubes polished on outside diameter are packaged in sealed cardboard tubes.

O.D. Inches	B.W. Gage	Wall Thickness	Dec. Inch	I.D. Dec. Inches	Approx. Wt. Lbs. per Lin. Ft.
Type 302 (Ornamental)					
1	18	.049		.902	.498
1	16	.065		.870	.649
1 5/8	16	.065		1.495	1.083

Type 304 Stainless Steel

ASTM-A-270 Grade for use in dairy and food industries where corrosion resistance and cleanliness are important factors.

O.D. Inches	B.W. Gage	Wall Thickness	Dec. Inch	I.D. Dec. Inches	Approx. Wt. Lbs. per Lin. Ft.
1	18	.049		.902	.498
1	16	.065		.870	.649
1 1/2	18	.049		1.402	.759
1 1/2	16	.065		1.370	.996
2	16	.065		1.870	1.343
2 1/2	16	.065		2.370	1.690
3	16	.065		2.870	2.037
3	14	.083		2.834	2.586
4	16	.065		3.870	2.732
4	14	.083		3.834	3.472

TYPE 304 ROUND STAINLESS STEEL TUBES

Spec. ASTM-A-269

Wall Gage	Wall Dec. Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.	Wall Gage	Wall Dec. Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.
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WELDED — Bright Annealed

20 Foot Mill Lengths

1/2 Inch O.D.				1 1/4 Inch O.D.			
18.....	.049.....	.402.....	.2360	18.....	.049.....	.1152.....	.6285
16.....	.065.....	.370.....	.3020	16.....	.065.....	.1120.....	.8226
5/8 Inch O.D.				1 3/8 Inch O.D.			
18.....	.049.....	.527.....	.3014	16.....	.065.....	.1245.....	.9094
16.....	.065.....	.495.....	.3888	1 1/2 Inch O.D.			
3/4 Inch O.D.				18.....	.049.....	.1402.....	.7593
20.....	.035.....	.680.....	.2673	16.....	.065.....	.1370.....	.9962
18.....	.049.....	.652.....	.3668	2 Inch O.D.			
16.....	.065.....	.620.....	.4755	18.....	.049.....	.1902.....	1.0210
7/8 Inch O.D.				16.....	.065.....	.1870.....	.13430
18.....	.049.....	.777.....	.4323	2 1/2 Inch O.D.			
16.....	.065.....	.745.....	.5623	18.....	.049.....	.2402.....	1.2830
1 Inch O.D.				16.....	.065.....	.2370.....	.16900
18.....	.049.....	.902.....	.4977	3 Inch O.D.			
16.....	.065.....	.870.....	.6491	16.....	.065.....	.2870.....	.20370

SEAMLESS — Annealed, White Pickle Finish Inside and Out

Random Lengths — 17 to 24 Feet

3/16 Inch O.D.				3/4 Inch O.D.			
20.....	.035.....	.117.....	.057	20.....	.035.....	.680.....	.267
1/4 Inch O.D.				18.....	.049.....	.652.....	.367
22.....	.028.....	.194.....	.066	16.....	.065.....	.620.....	.476
20.....	.035.....	.180.....	.080	7/8 Inch O.D.			
18.....	.049.....	.152.....	.105	16.....	.065.....	.745.....	.562
5/16 Inch O.D.				1 Inch O.D.			
20.....	.035.....	.242.....	.104	20.....	.035.....	.930.....	.361
18.....	.049.....	.214.....	.138	18.....	.049.....	.902.....	.498
3/8 Inch O.D.				16.....	.065.....	.870.....	.649
20.....	.035.....	.305.....	.127	1 1/8 Inch O.D.			
18.....	.049.....	.277.....	.171	16.....	.065.....	.995.....	.736
16.....	.065.....	.245.....	.215	1 1/4 Inch O.D.			
1/2 Inch O.D.				20.....	.035.....	.1180.....	.454
20.....	.035.....	.430.....	.174	18.....	.049.....	.1152.....	.629
18.....	.049.....	.402.....	.236	16.....	.065.....	.1120.....	.823
16.....	.065.....	.370.....	.302	1 1/2 Inch O.D.			
5/8 Inch O.D.				18.....	.049.....	.1402.....	.759
18.....	.049.....	.527.....	.301	16.....	.065.....	.1370.....	.996
16.....	.065.....	.495.....	.389	2 Inch O.D.			

TYPE 304 ROUND STAINLESS STEEL WELDED TUBES

Aircraft Quality — Spec. MIL-T-8504 — Drawn

Random Lengths — 17 to 24 Feet

O.D. Inch	Wall Thickness B.W. Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.	O.D. Inch	Wall Thickness B.W. Inch	I.D. Dec. Inch	Approx. Wt. Lbs. per Lin. Ft.
1/4	.22	.028	.0664	5/8	.20	.035	.1271
1/4	.20	.035	.0804	1	.22	.028	.2907
5/8	.22	.028	.1038	1	.20	.035	.3607

**TYPE 316 ROUND STAINLESS STEEL
ELECTRIC WELDED TUBES**

Spec. ASTM-A-269 — Bright Annealed

20 Foot Mill Lengths

O.D. Inches	B.W. Gage	Wall Thickness Dec. Inch	I.D. Dec. Inches	Approx. Wt. Lbs. per Lin. Ft.
1	16	.065	.870	.649
1 1/4	16	.065	1.120	.823
1 1/2	16	.065	1.370	.996
2	16	.065	1.870	1.343

TYPES 304 AND 316 STAINLESS STEEL PIPE

Welded and Seamless — Standard Pipe Sizes

Spec. ASTM-A-312 — White Pickle Finish Inside and Outside

Diameter Type 304	Inches Type 316	O.D. Dec. Inches	Wall Thick. Dec. Inch	I.D. Dec. Inches	Approx. Wt. Lbs. per Lin. Ft.
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WELDED — SCHEDULE 40 — 20 Foot Mill Lengths

1/8	1/8	.405	.068	.269	.2447
1/4	1/4	.540	.088	.364	.4248
3/8	3/8	.675	.091	.493	.5676
1/2	1/2	.840	.109	.622	.8510
5/8	5/8	1.050	.113	.824	1.1310
1	1	1.315	.133	1.049	1.6790
1 1/4	1 1/4	1.660	.140	1.380	2.2730
1 1/2	1 1/2	1.900	.145	1.610	2.7180
2	2	2.375	.154	2.067	3.6530

SEAMLESS — SCHEDULE 40 — Random Lengths 17 to 24 Feet

1/8	1/8	.405	.068	.269	.2447
1/4	1/4	.540	.088	.364	.4248
3/8	3/8	.675	.091	.493	.5676
1/2	1/2	.840	.109	.622	.8510
5/8	5/8	1.050	.113	.824	1.1310
1	1	1.315	.133	1.049	1.6790
1 1/4	1 1/4	1.660	.140	1.380	2.2730
1 1/2	1 1/2	1.900	.145	1.610	2.7180
2	2	2.375	.154	2.067	3.6530
2 1/2	2 1/2	2.875	.203	2.469	5.7930
3	3	3.500	.216	3.069	7.5760
3 1/2		4.000	.226	3.548	9.1090
4	4	4.500	.237	4.026	10.7900
5	5	5.563	.258	5.047	14.6100
6	6	6.625	.280	6.065	18.9700
8		8.625	.322	7.981	28.5500

SEAMLESS — SCHEDULE 80 — Random Lengths 17 to 24 Feet

1/8	1/8	.405	.095	.215	.3145
1/4	1/4	.540	.119	.302	.5351
1/2	1/2	.840	.147	.546	1.0880
5/8	5/8	1.050	.154	.742	1.4740
1	1	1.315	.179	.957	2.1720
1 1/4	1 1/4	1.660	.191	1.278	2.9970
1 1/2	1 1/2	1.900	.200	1.500	3.6310
2	2	2.375	.218	1.939	5.0220
2 1/2		2.875	.276	2.323	7.6610
3		3.500	.300	2.900	10.2500
4		4.500	.337	3.826	14.9800

STAINLESS STEEL SHEETS & PLATES

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ESSENTIAL INFORMATION FOR STAINLESS STEEL ORDERS

1—SPECIFICATION

Number
Date
Grade
Condition
Finish

2—APPLICATION

How Used

3—FABRICATION—SHEET & STRIP

Working: Rolling, forming, lock
seaming, spinning, stamping,
perforating, drop hammering,
drawing.
Welding: Arc, gas, spot, flash.
Finishing: Polishing, buffing, etc.

4—INSPECTION

Where, when and by whom.

NOTE: Specify if for Ordnance requiring salt spray or any other testing or conditions not mentioned above. This refers to stainless bars, billets, sheet and strip requirements. For commercial requirements not covered by any Army, Navy or government specification, Paragraph No. 1 or Question No. 1, which covers Specification, can be eliminated, but commercial type number, physicals and surface finish must be included in its place.

Stainless
Coils,
Sheets,
Plates

STAINLESS STEEL SPECIFICATIONS

IMPORTANT NOTICE

- 1—Some specifications permit the use of several finishes and tempers. When ordering, purchaser should state finish desired.
- 2—These specifications often cover tolerances closer than commercial, resulting in higher prices than may be necessary. Unless close tolerances are required, commercial tolerances should be specified when ordering.
- 3—The AISI Type number applies to the same general analysis, but does not always exactly agree with the analysis of Government specifications. This commercial type number is a guide to the applicable base price.

FEDERAL SPECIFICATIONS

QQ-S-766-c — PLATES, SHEETS, STRIP AND STRUCTURAL SHAPES

Class 301	Condition A	Class 310	Condition A
301	1/4 Hard	316	A
301	1/2 Hard	316L	A
301	Full Hard	321	A
302	A	347	A
304	A	410	A
304L	A	430	A
305	A		

MILITARY SPECIFICATIONS

MIL-S-854 Superseding (47-S-20) (INT)

PLATES, SHEETS, STRIP AND SHAPES

AISI Type Nos.
(Nearest)

Class 1—Condition A	304
2 A, B, C, D, E	302
3 A	410
4 A	430
8 A	321
8 A	347
9 A	316
11 A	310

MIL-S-4043 (USAF)

Amend. 1

Plate, Sheet, and Strip.....	304ELC
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MIL-S-5059A (ASG) AMENDMENT 1

Comp. 301 Sheet and Strip.....	301
Comp. 302 Sheet and Strip.....	302
Comp. 316 Sheet and Strip.....	316

MIL-S-6721A

Comp. Ti. Plate, Sheet, and Strip.....	321
Comp. Ch. Plate, Sheet, and Strip.....	347

MIL-S-25043B

Amend. 1 Plate, Sheet and Strip.....	17-7PH
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AERONAUTICAL MATERIAL SPECIFICATIONS

AISI Type Nos.
(Nearest)

AMS 5504D	Plate, Sheet, and Strip.....	410
AMS 5510G	Plate, Sheet, and Strip.....	321
AMS 5511A	Plate, Sheet, and Strip.....	304ELC
AMS 5512B	Plate, Sheet, and Strip.....	347
AMS 5513	Plate, Sheet, and Strip.....	304
AMS 5514A	Plate, Sheet, and Strip.....	305
AMS 5521B	Plate, Sheet, and Strip.....	310
AMS 5524B	Plate, Sheet, and Strip.....	316
AMS 5526B	Plate, Sheet, and Strip.....	19-9DL
AMS 5528A	Sheet and Plate.....	17-7PH

STAINLESS STEEL SHEET AND PLATE TYPE CHARACTERISTICS

TYPE 301 is an austensitic chromium nickel steel capable of attaining high tensile strength and ductility by moderate or severe cold working. It is used largely in the cold rolled or cold drawn condition in the form of sheet, strip and wire. Type 301 is nonmagnetic when annealed, but is magnetic when cold worked.

TYPE 302 is the general purpose austensitic chromium nickel stainless steel. Its corrosion resistance is superior to that of Type 301. Type 302 is used largely in the annealed condition. It can be cold worked to high tensile strengths but with slightly lower ductility than Type 301. It is nonmagnetic when annealed, but is slightly magnetic when cold worked.

TYPE 304 was developed to meet the requirements of welded construction. In Type 304 the carbon content is held to .08 percent maximum. This reduced carbon content, as compared to Type 302, substantially reduces carbide precipitation.

Type 304 is used where corrosion resistance and good mechanical properties are of primary importance. This stainless steel has a destructive scaling temperature of 1600°F. under continuous service. It is non-magnetic in the annealed state and is non-hardenable by heat treatment. Cold working increases both hardness and tensile strength. It has ductility, good working qualities for bending, forming and general fabrication.

TYPE 304 ELC (Extra Low Carbon) is used primarily for requirements employing welded fabrication. The .03 percent carbon maximum content eliminates carbide precipitation occurring in the 800°-1650°F. range.

TYPE 305 (FREE SPINNING) has a lower rate of work hardening than Type 302 or 304. Increased nickel content reduces the work hardening rate and increases the amount of spinning that can be done between anneals. It was especially developed for spinning and drop hammer special drawing.

TYPE 310 offers high heat resisting properties and excellent resistance to scaling because of its high chromium and nickel content. It has high scaling resistance at temperatures up to 2000 degrees fahrenheit during continuous service. It produces strong welds easily because of its ductility. It is used in applications requiring an excellent combination of scaling resistance, high temperature, tensile and creep strengths.

TYPE 316 — This grade, with the addition of Molybdenum, was developed to improve the corrosion resistance of the 18-8 types. Nickel content has been increased to make it more workable. It has a higher creep strength at elevated temperatures than other 18-8 stainless steels as well as a high short time tensile strength. Type 316 has found wide application in the chemical, textile, citrus juice and paper pulp industries. In general, welding, machining, etc., can be performed in the same manner as on Type 302.

TYPE 316 ELC (Extra Low Carbon) is used primarily for requirements employing welded fabrication. The .03 percent carbon maximum content eliminates carbide precipitation occurring in the 800°-1650°F.

TYPE 321 (Titanium Stabilized) — By the addition of titanium Type 321 is designed to eliminate intergranular corrosion by prevention of harmful chromium carbide precipitation. It is suitable where continuous service in the carbide precipitation range of 800°-1450°F. will not permit the use of such types as 304. Type 321 performs well in deep drawing and drop hammer operations.

STAINLESS STEEL SHEET AND PLATE TYPE CHARACTERISTICS (Cont.)

TYPE 347 (Columbium Stabilized) was designed to eliminate intergranular corrosion by the prevention of harmful carbide precipitation. This is accomplished by adding a combination of Columbium and Tantalum. It performs well in deep drawing and drop hammer operations.

TYPE 410 is the lowest in cost of all the stainless steels. Suitable where severe corrosion problems are not an important factor. It has good mechanical properties, is readily drawn, forged and cold worked.

A wide range of mechanical characteristics can be obtained by heat treatment. The best corrosion resistance and mechanical properties are obtained in the heat treated condition. This type has sufficient ductility to assure severe forming. It is easy to weld, but welds should be annealed if the assembly is to undergo movement or shock.

Type 410 offers inferior resistance to various chemicals; however, it has certain qualities which make its use preferable in some applications such as oil refining equipment. It has good resistance to scaling at high temperatures, making it suitable for furnace parts, furnaces, etc., operating below 1200°F.

Type 410 may be used where dampness and chemical pollution cause ordinary steel to fail quickly, or where abrasive wear or inaccessibility makes paint protection difficult as in grain elevator chutes, coke and coal handling equipment.

TYPE 430 is recommended where a ductile, workable alloy with good corrosion resistance is required. When used in a temperature range of 800-1200°F. over long periods of time the alloy remains tough and shock resistant. However, it may lose toughness when cooled to room temperature.

This type is very resistant to sulphur bearing gases at its maximum service temperature. Its low coefficient of thermal expansion makes it suitable for intermittent high temperature service.

PH 15-7 MO is a high strength precipitation hardening stainless steel possessing an outstanding combination of room temperature and elevated temperature mechanical properties. It is readily fabricated in the annealed condition.

PH 15-7 MO exhibits corrosion resistance comparable to Type 302-304. The chemical analysis is maintained in approximately the same balance as in 17-7 PH in order to provide similar transforming and hardening characteristics during heat treatment.

Hardened to condition TH 1050 15-7 MO has a typical ultimate tensile strength of 210,000 PSI, condition RH 240,000 PSI and condition CH 900 265,000 PSI. Molybdenum is added to this stainless steel to increase its mechanical properties at temperatures up to 1000°F.

17-7PH is a chromium-nickel stainless steel with design and production advantages possessed by none of the standard stainless grades. In addition to the characteristics of good workability, easy hardening and high strength, 17-7 PH also possesses corrosion resistance approximately that of Types 302 and 304.

17-7 PH possesses excellent mechanical properties at elevated temperature. Hardened to condition TH 1050 17-7 PH has a typical ultimate tensile strength of 200,000 PSI, condition CH 900 265,000 PSI.

TYPE 19-9DL is a high carbon chrome nickel alloy that retains its corrosion resistance and stress properties at elevated temperatures.

TYPE 301 STAINLESS STEEL SHEETS AND STRIP

Spec. MIL-S-5059A (ASG) Comp. 301

FINISHES { 23¹⁵/₁₆ Inch Width — No. 2 Strip Finish
 { 36 Inch Width — 2B Finish

Thickness Decimal Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Decimal Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.
Physical Condition 1/4 Hard Temper					
.012	23 ¹⁵ / ₁₆ x120	.50	.040	36 x120	1.68
.016	36 x120	.67	.050	36 x120	2.10
.020	36 x120	.84	.063	36 x120	2.64
.025	36 x120	1.05	.080	36 x120	3.36
.032	36 x120	1.34	.090	36 x120	3.78
.036	36 x120	1.51	.125	23 ¹⁵ / ₁₆ x120	5.25

Physical Condition 1/2 Hard Temper

.012	23 ¹⁵ / ₁₆ x120	.50	.040	36 x120	1.68
.012	36 x120	.50	.050	36 x120	2.10
.016	36 x120	.67	.063	36 x120	2.64
.020	36 x120	.84	.080	36 x120	3.36
.025	36 x120	1.05	.090	23 ¹⁵ / ₁₆ x120	3.78
.032	36 x120	1.34	.125	23 ¹⁵ / ₁₆ x120	5.25
.036	36 x120	1.51			

Physical Condition Full Hard Temper

.0161	23 ¹⁵ / ₁₆ x120	.45	.040	36 x120	1.68
.020	23 ¹⁵ / ₁₆ x120	.84	.050	23 ¹⁵ / ₁₆ x120	2.10
.025	23 ¹⁵ / ₁₆ x120	1.05	.050	36 x120	2.10
.025	36 x120	1.05	.063	23 ¹⁵ / ₁₆ x120	2.64
.032	23 ¹⁵ / ₁₆ x120	1.34	.063	36 x120	2.64
.0321	36 x120	1.35	.080	23 ¹⁵ / ₁₆ x120	3.36
.036	23 ¹⁵ / ₁₆ x120	1.51	.090	23 ¹⁵ / ₁₆ x120	3.78
.040	23 ¹⁵ / ₁₆ x120	1.68	.125	23 ¹⁵ / ₁₆ x120	5.25

TYPE 302-304 STAINLESS STEEL STRIP, STRIP COIL AND SHEET COIL

Spec. MIL-S-854 Class 1 Type A, QQ-S-766A Class 1 Cond. A
 AMS-5513 and ASTM-A-240

Thickness Decimal Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Decimal Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.
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STRIP — NO. 2 FINISH — Cut Lengths

.010	18 x 120	.42	.012	23 ¹⁵ / ₁₆ x 120	.50
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STRIP COILS — NO. 2 FINISH — Random Weight

.020	23 ¹⁵ / ₁₆ x Coil	.84	.036	23 ¹⁵ / ₁₆ x Coil	1.51
.025	23 ¹⁵ / ₁₆ x Coil	1.05	.050	23 ¹⁵ / ₁₆ x Coil	2.10
.031	23 ¹⁵ / ₁₆ x Coil	1.30			

SHEET COIL — NO. 2 FINISH — Random Weight Coils

We can slit coils to width, cut to length and roller level according to customer requirements.

Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.
.020	36	.840	.036	36	1.512
.025	30, 36	1.050	.050	36	2.100
.0321	36	1.348			

STAINLESS STEEL SHEETS**TYPE 302-304 — Spec. MIL-S-854 Class 1 Type A,****QQ-S-766A Class 1 Cond. A and AMS-5513 and ASTM-A-240****NO. 2B FINISH — UNPOLISHED**

Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.
28.. .016..	36x120..	.67.. 20.10	16.. .062..	36x96 ..	2.60.. 62.40
	48x120..	.67.. 26.80		36x120..	2.60.. 78.00
26.. .020..	24x96 ..	.84.. 13.44		42x144..	2.60.. 78.20
	24x120..	.84.. 16.80		48x96 ..	2.60.. 83.20
	30x96 ..	.84.. 16.80		48x120..	2.60.. 104.00
	30x120..	.84.. 21.00		48x144..	2.60.. 124.80
	36x96 ..	.84.. 20.16		60x120..	2.60.. 130.00
	36x120..	.84.. 25.20		60x144..	2.60.. 156.00
	48x120..	.84.. 33.60	14.. .078..	24x96 ..	3.28.. 52.48
24.. .025..	24x96 ..	1.05.. 16.80		24x120..	3.28.. 65.60
	24x120..	1.05.. 21.00		30x96 ..	3.28.. 65.60
	30x96 ..	1.05.. 21.00		30x144..	3.28.. 98.40
	30x120..	1.05.. 26.25		36x96 ..	3.28.. 78.72
	36x96 ..	1.05.. 25.20		36x120..	3.28.. 98.40
	36x120..	1.05.. 31.50		36x144..	3.28.. 118.08
	48x96 ..	1.05.. 33.60		48x96 ..	3.28.. 104.96
	48x120..	1.05.. 42.00		48x120..	3.28.. 131.20
22.. .032..	24x96 ..	1.34.. 21.44		48x144..	3.28.. 157.44
	24x120..	1.34.. 26.80		60x120..	3.28.. 164.00
	30x96 ..	1.34.. 26.80		60x144..	3.28.. 196.80
	30x120..	1.34.. 33.50	13.. .090..	36x120..	3.78.. 113.40
	36x96 ..	1.34.. 32.16		48x96 ..	3.78.. 120.96
	36x120..	1.34.. 40.20		48x120..	3.78.. 151.20
	48x96 ..	1.34.. 42.88	12.. .109..	24x120..	4.58.. 91.60
	48x120..	1.34.. 53.60		36x120..	4.58.. 137.40
20.. .036..	24x96 ..	1.51.. 24.16		48x96 ..	4.58.. 146.56
	24x120..	1.51.. 30.20		48x120..	4.58.. 183.20
	30x96 ..	1.51.. 30.20		48x144..	4.58.. 219.84
	30x120..	1.51.. 37.75		60x96 ..	4.58.. 183.20
	36x96 ..	1.51.. 36.24		60x120..	4.58.. 229.00
	36x120..	1.51.. 45.30		60x144..	4.58.. 274.80
	48x96 ..	1.51.. 48.32		72x144..	4.58.. 329.76
	48x120..	1.51.. 60.40	11.. .125..	24x120..	5.25.. 105.00
19.. .040..	36x120..	1.68.. 50.40		36x120..	5.25.. 157.50
18.. .050..	24x96 ..	2.10.. 33.60		48x96 ..	5.25.. 168.00
	24x120..	2.10.. 42.00		48x120..	5.25.. 210.00
	30x96 ..	2.10.. 42.00		48x144..	5.25.. 252.00
	30x120..	2.10.. 52.50	10.. .141..	24x120..	5.92.. 118.40
	36x96 ..	2.10.. 50.40		36x120..	5.92.. 177.60
	36x120..	2.10.. 63.00		48x96 ..	5.92.. 189.44
	48x96 ..	2.10.. 67.20		48x120..	5.92.. 236.80
	48x120..	2.10.. 84.00		48x144..	5.92.. 284.16
	48x144..	2.10.. 100.80		60x120..	5.92.. 296.00
16.. .062..	24x96 ..	2.60.. 41.60		60x144..	5.92.. 355.20
	24x120..	2.60.. 52.00		72x144..	5.92.. 426.24
	30x96 ..	2.60.. 52.00	8.. .174..	36x120..	7.31.. 219.30
	30x120..	2.60.. 65.00		48x120..	7.31.. 292.40

TYPE 304 — Spec. MIL-S-5059A (ASG) Cond. A**NO. 2D FINISH — STENCILED TO SPEC.**

Thick- ness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thick- ness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.
.0161..	36x120....	.68.... 20.40	.040....	36x120....	1.68.... 50.40
.020....	36x120....	.84.... 25.20	.050....	36x120....	2.10.... 63.00
.025....	36x120....	1.05.... 31.50	.063....	36x120....	2.65.... 79.50
.0321..	36x120....	1.34.... 40.20			

STAINLESS STEEL SHEETS

TYPE 302-304 — Spec. MIL-S-854 Class 1 Type A, (Cont.)

QQ-S-766A Class 1 Cond. A and AMS-5513 and ASTM-A-240

NO. 4 FINISH ONE SIDE

Thickness Gage Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet	Thickness Gage Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet
26.. .020..	24x96 ..	.84..	13.44	18.. .050..	48x120 ..	.210..	84.00
	24x120..	.84..	16.80		48x144 ..	.210..	100.80
	30x96 ..	.84..	16.80		60x120 ..	.210..	105.00
	30x120..	.84..	21.00		60x144 ..	.210..	126.00
	36x96 ..	.84..	20.16	16.. .062..	24x96 ..	.260..	41.60
	36x120..	.84..	25.20		24x120 ..	.260..	52.00
	48x120..	.84..	33.60		30x96 ..	.260..	52.00
24.. .025..	24x96 ..	1.05..	16.80		30x120 ..	.260..	65.00
	24x120..	1.05..	21.00		36x96 ..	.260..	62.40
	30x96 ..	1.05..	21.00		36x120 ..	.260..	78.00
	30x120..	1.05..	26.25		42x144 ..	.260..	109.20
	36x96 ..	1.05..	25.20		48x96 ..	.260..	83.20
	36x120..	1.05..	31.50		48x120 ..	.260..	104.00
	48x96 ..	1.05..	33.60		48x144 ..	.260..	124.80
	48x120..	1.05..	42.00		60x120 ..	.260..	130.00
22.. .032..	24x96 ..	1.34..	21.44		60x144 ..	.260..	156.00
	24x120..	1.34..	26.80	14.. .078..	24x96 ..	3.28..	52.48
	30x96 ..	1.34..	26.80		24x120 ..	3.28..	65.60
	30x120..	1.34..	33.50		30x96 ..	3.28..	65.60
	36x96 ..	1.34..	32.16		30x144 ..	3.28..	98.40
	36x120..	1.34..	40.20		36x96 ..	3.28..	78.82
	48x96 ..	1.34..	42.88		36x120 ..	3.28..	98.40
	48x120..	1.34..	53.60		48x96 ..	3.28..	104.96
20.. .036..	24x96 ..	1.51..	24.16		48x120 ..	3.28..	131.20
	24x120..	1.51..	30.20		48x144 ..	3.28..	157.44
	30x96 ..	1.51..	30.20		60x120 ..	3.28..	164.00
	30x120..	1.51..	37.75		60x144 ..	3.28..	196.80
	36x96 ..	1.51..	36.24	12.. .109..	24x120 ..	4.58..	91.60
	36x120..	1.51..	45.30		36x120 ..	4.58..	137.40
	48x96 ..	1.51..	48.32		48x120 ..	4.58..	183.20
	48x120..	1.51..	60.40		48x144 ..	4.58..	219.84
19.. .040..	36x120..	1.60..	50.40		60x144 ..	4.58..	274.80
18.. .050..	24x96 ..	2.10..	33.60	11.. .125..	24x120 ..	5.25..	105.00
	24x120..	2.10..	42.00		36x120 ..	5.25..	157.50
	30x96 ..	2.10..	42.00		48x120 ..	5.25..	210.00
	30x120..	2.10..	52.50		48x144 ..	5.25..	252.00
	36x96 ..	2.10..	50.40	10.. .141..	24x120 ..	5.92..	118.40
	36x120..	2.10..	63.00		36x120 ..	5.92..	177.60
	48x96 ..	2.10..	67.20		48x120 ..	5.92..	236.80

TYPE 304 ELC (Extra Low Carbon)

Spec. MIL-S-4043 (USAF) and AMS-5511A

NO. 2B FINISH, CONDITION ANNEALED

Thickness Gage Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet	Thickness Gage Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet
16.. .062..	48x120 ..	.260..	104.00	11.. .125..	48x120 ..	.525..	210.00
14.. .078..	48x120 ..	3.28..	131.20	10.. .140..	48x120 ..	.592..	236.80
12.. .109..	48x120 ..	4.58..	183.20				

TYPE 305 (Free Spinning)

Spec. AMS-5514A

NO. 1 FINISH — HOT ROLLED, ANNEALED AND PICKLED

Thick- ness Dec. Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet	Thick- ness Dec. Inch	Width & Length Inches	Approx. per Sq. Ft.	Wt. Lbs. Sheet
.025...	36x120...	1.05...	31.50	.036...	36x120...	1.51...	45.30
.032...	36x120...	1.34...	40.20				

STAINLESS STEEL SHEET COIL AND SHEETS**TYPE 310 — Spec. AMS-5521B****SHEETS — NO. 2D FINISH**

Thickness Dec. Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet	Thickness Dec. Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet
.025	36x120	1.05	31.50	.078	36x120	3.28	98.40
.032	36x120	1.34	40.20	.093	36x120	3.91	117.30
.042	36x120	1.76	52.80	.125	48x120	5.25	210.00
.050	36x120	2.10	63.00	.141	48x120	5.92	236.80
.064	36x120	2.69	80.70				

TYPE 316 — Spec. MIL-S-5059A (ASG) Comp. 316, Cond. A**SHEETS — NO. 2B COLD ROLLED FINISH — ANNEALED****SHEETS — NO. 4 FINISH — POLISHED ANNEALED**

Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet	Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet
26..	.019.. 36x120..	.80..	24.00	16..	.062.. 36x120..	.260..	78.00
	48x120..	.80..	32.00		36x144..	.260..	93.60
24..	.025.. 36x120..	1.05..	31.50		48x120..	.260..	104.00
	48x120..	1.05..	42.00		48x144..	.260..	124.80
22..	.031.. 36x120..	1.30..	39.00		60x120..	.260..	130.00
	48x120..	1.30..	52.00	14..	.078.. 48x120..	3.28..	131.20
20..	.036.. 36x120..	1.55..	46.50	12..	.109.. 36x96..	4.58..	109.92
	48x120..	1.55..	62.00		48x120..	4.58..	183.20
18..	.050.. 30x120..	2.10..	52.50		60x120..	4.58..	229.00
	36x96 ..	2.10..	50.40		60x144..	4.58..	274.80
	36x120..	2.10..	63.00	11..	.125.. 48x120..	5.25..	210.00
	48x120..	2.10..	84.00	10..	.141.. 48x120..	5.92..	236.80
16..	.062.. 30x120..	2.60..	65.00				

TYPE 316 ELC (Extra Low Carbon)**Spec. ASTM-A240, 58T (.03 Max. Carbon)****SHEETS — NO. 2B FINISH**

Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet	Thickness Dec. Gage Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Wt. Lbs. per Sheet
16..	.062.. 48x120..	.260..	104.00	11..	.125.. 48x120..	5.25..	210.00
14..	.078.. 48x120..	3.28..	131.20	10..	.141.. 48x120..	5.92..	236.80
12..	.109.. 48x120..	4.58..	183.20				

TYPE 321 (Titanium Stabilized)**Spec. MIL-S-6721 Comp. Ti, and AMS-5510F**

SHEET COIL { 36 INCHES WIDE — NO. 2B FINISH
 { 48 INCHES WIDE — NO. 2D FINISH

We can slit coils to width, cut to length and roller level according to customer requirements.

Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.
.0161	36	.68	.0351	36	1.50
.020	36	.84	.040	36, 48	1.68
.025	36	1.05	.045	36	1.89
.0321	36, 48	1.35	.050	48	2.10

SHEETS — NO. 2D FINISH

Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.		
.010	36x120	.42	12.60	.056	36x120	2.35	70.50
.0161	36x120	.68	20.40	.063	36x120	2.60	78.00
.020	36x120	.84	25.20	.080	36x120	3.36	100.80
.025	36x120	1.05	31.50	.090	36x120	3.78	113.40
.032	36x120	1.34	40.20	.109	48x120	4.58	183.20
	48x120	1.34	53.60				
.036	36x120	1.51	45.30	.125	36x120	5.25	157.50
.040	36x120	1.76	52.80		48x120	5.25	210.00
.050	36x120	2.10	63.00	.156	36x120	6.56	196.88

STAINLESS STEEL FOIL, STRIP COILS, SHEET COILS AND SHEETS

TYPE 347 (Columbium Stabilized)

Spec. MIL-S-6721, Comp. Cb, Ta and AMS-5512B

SHEETS — NO. 2D FINISH

Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Approx. Wt. Lbs. per Sheet	Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Approx. Wt. per Sheet
.0161	36x120	.68	20.40	.063	36x120	2.65	79.50
.020	36x120	.84	25.20	.063	48x96	2.65	84.80
.025	36x120	1.05	31.50	.080	36x120	3.36	100.80
.032	36x120	1.34	40.20	.094	48x96	3.95	126.40
.036	36x120	1.51	45.30	.125	36x120	5.25	157.50
.040	36x120	1.68	50.40	.125	48x96	5.25	168.00
.050	36x120	2.10	63.00				

TYPE 410 — Spec. AMS-5504D

SHEETS — NO. 2D FINISH

Thickness Gage Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Gage Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.
24	.025. 26x120	1.05.. 31.50	16	.063. 48x120	2.62.. 104.80
22	.032. 36x120	1.30.. 39.00	14	.080. 48x120	3.22.. 128.80
19	.040. 36x120	1.65.. 49.44	12	.109. 48x120	4.50.. 180.00
18	.050. 36x120	2.10.. 63.00	11	.125. 48x120	5.15.. 206.00
16	.063. 36x120	2.62.. 78.75	10	.140. 48x120	5.79.. 231.60

TYPE 430 (Cold Rolled Annealed)

Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.
STRIP COIL — No. 2 STRIP FINISH — Random Weight Coils					
.018	23 ¹ / ₂ x Coil	.74	.031	23 ¹ / ₂ x Coil	1.28
.020	25 ¹ / ₂ x Coil	.82	.036	23 ¹ / ₂ x Coil	1.48
.025	23 ¹ / ₂ x Coil	1.03	.042	23 ¹ / ₂ x Coil	1.73
SHEET COIL — No. 2B FINISH — Random Weight Coils					
.018	36	.74	.025	36	1.03
.020	36	.82			

We can slit coils to width, cut to length and roller level according to customer requirements.

Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	
SHEETS — No. 2B FINISH						
.020	36x120	.82	24.60	.036	36x120	1.48
.025	30x120	1.03	25.75	.050	36x120	2.06
	36x120	1.03	30.90	.063	36x120	2.60
.0321	36x120	1.32	39.60		48x120	2.60
.036	30x120	1.48	37.00			104.00

PH 15-7 MO

Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.
FOIL IN COILS — Condition A, No. 2 FINISH — No. 3 Edge Slit					
.0015	12 ¹ / ₂ x Coil	.0663			

Approximate 100 Lb. Coils — Boxed

.0015 .12¹/₂ x Coil .0663

SHEETS — Condition A — No. 2D FINISH — Dull Cold Rolled

.010	36x120	.42	12.6	.071	36x120	2.98	89.4
.0161	36x120	.67	20.1	.0755	36x120	3.17	95.1
.020	36x120	.84	25.2	.078	36x120	3.28	98.4
.024	36x120	1.01	30.3	.088	36x120	3.70	111.0
.038	36x120	1.60	48.0	.090	36x120	3.78	113.4
.040	36x120	1.68	50.4	.095	36x120	3.99	119.7
.050	36x120	2.10	63.0	.100	36x120	4.20	126.0

STAINLESS STEEL FOIL, SHEET COILS AND SHEETS**17-7PH — Spec. AMS-5528 and MIL-S-25043**

Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.
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FOIL IN COILS — Condition A, No. 2 FINISH — No. 3 Edge Slit**Approximate 100 Lb. Coils — Boxed**

.001.....	12½ x Coil.....	.0442 .0015.....	12½ x Coil.....	.0663
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SHEET COIL — Condition A, No. 2B FINISH

.010.....	36 x Coil.....	.420
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We can slit coils to width, cut to length and roller level according to customer requirements.

Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.
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SHEETS — Condition A — 2D FINISH — DULL COLD ROLLED

.0161	36x120.....	.67.....	20.10	.070	36x120.....	2.94.....	88.20
.020	36x120.....	.84.....	25.20	.080	36x120.....	3.36.....	100.80
.025†	36x120.....	1.05.....	31.50	.090	36x120.....	3.78.....	113.40
.0321†	36x120.....	1.34.....	40.20	.090	48x120.....	3.78.....	151.20
.0321	48x120.....	1.34.....	53.60	.100	36x120.....	4.20.....	126.00
.036	36x120.....	1.51.....	45.30	.100	48x120.....	4.20.....	168.00
.040†	36x120.....	1.68.....	50.40	.112	36x120.....	4.70.....	141.00
.040	36x144.....	1.68.....	60.48	.125	36x120.....	5.25.....	157.50
.045	36x120.....	1.99.....	59.70	.125	48x120.....	5.25.....	210.00
.050†	36x120.....	2.10.....	63.00	.140	48x120.....	5.88.....	235.20
.063†	36x120.....	2.65.....	79.50	.160	36x120.....	6.72.....	201.60

†Also available in one-half Standard Mill Thickness Tolerance

TYPE 19-9DL — Spec. AMS-5526B**SHEETS — No. 2D FINISH**

Thickness Dec. Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Dec. Inch	Width and Length Inches	Approx. Wt. Lbs. per Sq. Ft.		
.055	30x96.....	2.24.....	44.80	.085	30x96.....	3.46.....	69.20
.069	30x96.....	2.81.....	56.20				

STAINLESS STEEL PLATES**TYPE 304 — Spec. ASTM-A-240-61T, QQS-766C and MIL-S-854 Class 1, Condition Annealed****TYPE 304 ELC (Extra Low Carbon)****Spec. ASTM-A-240-61T, MIL-S-4043 and AMS-5511A****TYPE 310 — Spec. ASTM-A-240-61T and AMS-5521B****TYPE 316 — Spec. ASTM-A-240-61T, QQS-766C and MIL-S-5059A (ASG) Comp. 316, Cond. A****TYPE 316 ELC (Extra Low Carbon)****Spec. MIL-S-854 Cl. 9 and ASTM-A-240-61T (.03 Max. Carbon)****TYPE 321 (Titanium Stabilized)****Spec. ASTM-A-240-61T, AMS-5510G and MIL-S-6721 Comp. Ti****TYPE 347 (Columbium Stabilized)****Spec. AMS-5521B, QQS-766C and MIL-S-6721, Comp. Cb, Ta****TYPE 410 — Spec. ASTM-A-240-61T, AMS-M209A and AMS-5504C****TYPE CHARACTERISTICS — Refer to Pages 121 and 122****STOCKED SIZES — Refer to Pages 129 to 132 Inclusive**

STAINLESS STEEL PLATES

Hot Rolled, Annealed and Pickled

X = STOCKED SIZES

Thickness & Size, Inches	Approx. Wt. Lbs. per		TYPE							
	Sq. Ft.	Plate	304	304 ELC	310	316	316 ELC	321	347	410
3/16X										
48x120	7.985	319.40	X	X	X	X	X	X	X	X
48x240	7.985	638.80	X	X	X	X	X	X	X	X
60x120	7.985	399.25	X	X	..	X	X	X	X	X
60x240	7.985	798.50	X	X	..	X	X	X	X	X
72x120	7.985	479.10	X	X	X	X	X	X	X	X
72x216	7.985	862.38	+X	+X	..	..	..	..	..	..
72x216	7.985	862.38	+X	..	..	..	..	..	..	..
72x240	7.985	958.20	X	X	X	X	X	X	X	X
84x120	7.985	558.95	X	X	..	X	X	X	X	..
84x240	7.985	1117.90	X	X	..	X	X	X	X	..
96x120	8.295	663.60	X	X	..	X	X	X	X	..
96x240	8.295	1327.20	X	X	..	X	X	X	X	..
1/4X										
48x96	10.646	340.67	X	X	X	X	X	X	X	X
48x120	10.646	425.84	X	X	X	X	X	X	X	X
48x240	10.646	851.68	X	X	X	X	X	X	X	X
60x120	10.646	532.30	X	..	..	X	X	X	X	X
60x144	10.646	638.76	X	..	..	..	X	..	..	..
60x240	10.646	1064.60	X	..	..	X	X	X	X	X
72x120	10.646	638.76	X	X	..	X	X	X	X	X
72x144	10.646	766.51	X	..	..	..	X	..	..	..
72x240	10.646	1277.52	X	X	..	X	X	X	X	X
84x120	10.646	745.22	X	X	..	X	X	X	X	X
84x240	10.646	1490.44	X	X	..	X	X	X	X	X
96x120	10.956	876.48	X	X	..	X	X	X	X	X
96x240	10.956	1752.96	X	X	..	X	X	X	X	X
5/16X										
48x120	13.308	532.32	X	..	..	X	..	X	X	..
48x240	13.308	1064.64	X	..	..	X	..	X	X	..
60x120	13.308	665.40	X	..	..	X	..	X	X	..
60x240	13.308	1330.80	X	..	..	X	..	X	X	..
72x120	13.308	798.48	X	..	..	X	..	X	X	..
72x240	13.308	1596.96	X	..	..	X	..	X	X	..
84x120	13.308	931.56	X	..	..	X	..	X	X	..
84x240	13.308	1863.12	X	..	..	X	..	X	X	..
96x120	13.437	1704.96	X	..	..	X	..	X	X	..
96x240	13.437	2149.92	X	..	..	X	..	X	X	..
3/8X										
48x120	15.968	638.72	X	X	X	X	X	X	X	X
48x240	15.968	1277.44	X	X	X	X	X	X	X	X
60x120	15.968	798.40	X	X	X	X	X	X	X	X
60x240	15.968	1596.80	X	X	X	X	X	X	X	X

†Cold Rolled — ‡Temper Rolled

(Continued on page 130)

STAINLESS STEEL PLATES (Cont.)**Hot Rolled, Annealed and Pickled****X = STOCKED SIZES**

Thickness & Size, Inches	Approx. Wt. Lbs. per		TYPE							
	Sq. Ft.	Plate	304	304 ELC	310	316	316 ELC	321	347	410
3/8X										
72x120	15.968	958.08	X	X	X	X	X	X	X	X
72x240	15.968	1916.16	X	X	X	X	X	X	X	X
84x120	15.968	1117.76	X	X	X	X	X	X	X	X
84x240	15.968	2235.52	X	X	X	X	X	X	X	X
96x120	16.123	1289.84	X	X	X	X	X	X	X	..
96x240	16.123	2579.68	X	X	X	X	X	X	X	..
7/16X										
48x120	18.630	745.20	X	..	..	..	..	..	..	..
48x240	18.630	1490.40	X	..	..	..	..	..	..	..
60x120	18.630	931.50	X	..	..	..	..	..	..	..
60x240	18.630	1863.00	X	..	..	..	..	..	..	..
72x120	18.630	1117.80	X	..	..	..	..	..	..	..
72x240	18.630	2235.60	X	..	..	..	..	..	..	..
84x120	18.630	1304.10	X	..	..	..	..	..	..	..
84x240	18.630	2608.20	X	..	..	..	..	..	..	..
96x120	18.810	1504.80	X	..	..	..	..	..	..	..
96x240	18.810	3009.60	X	..	..	..	..	..	..	..
1/2X										
48x120	21.291	851.64	X	X	X	X	X	X	X	X
48x240	21.291	1703.28	X	X	X	X	X	X	X	X
60x120	21.291	1064.55	X	X	X	X	X	X	X	X
60x240	21.291	2129.10	X	X	X	X	X	X	X	X
72x120	21.291	1277.46	X	X	X	X	X	X	X	X
72x240	21.291	2554.92	X	X	X	X	X	X	X	X
84x120	21.291	1490.37	X	X	X	X	X	X	X	X
84x240	21.291	2980.74	X	X	X	X	X	X	X	X
96x120	21.498	1719.84	X	X	X	X	X	X	X	..
96x240	21.498	3439.68	X	X	X	X	X	X	X	..
5/8X										
48x120	26.614	1054.56	X	X	..	X	..	X	X	X
48x240	26.614	2129.12	X	X	..	X	..	X	..	X
60x120	26.614	1330.70	X	X	..	X	..	X	..	X
60x240	26.614	2661.40	X	X	..	X	..	X	..	X
72x120	26.614	1596.84	X	X	..	X	..	X	..	X
72x240	26.614	3193.68	X	X	..	X	..	X	..	X
84x120	26.614	1862.98	X	X	..	X	..	X	..	X
84x240	26.614	3725.96	X	X	..	X	..	X	..	X
96x120	26.614	2129.12	X	X	..	X	..	X	..	X
96x240	26.614	4258.24	X	X	..	X	..	X	..	X

(Continued on page 131)

STAINLESS STEEL PLATES (Cont.)

Hot Rolled, Annealed and Pickled

X = STOCKED SIZES

Thickness & Size, Inches	Approx. Wt. Lbs. per		TYPE							
	Sq. Ft.	Plate	304	304 ELC	310	316	316 ELC	321	347	410
3/4x										
48x120	31.937	1277.48	X	X	X	X	X	X	X	..
48x240	31.937	2554.96	X	X	X	X	X	X	X	..
60x120	31.937	1596.85	X	X	X	X	X	X	X	..
60x240	31.937	3193.70	X	X	X	X	X	X	X	..
72x120	31.937	1916.22	X	X	X	X	X	X	X	..
72x240	31.937	3832.44	X	X	X	X	X	X	X	..
84x120	31.937	2235.59	X	X	X	X	X	X	X	..
84x240	31.937	3832.44	X	X	X	X	X	X	X	..
96x120	31.937	2554.96	X	X	X	X	X	X	..	..
96x240	31.937	5109.92	X	X	X	X	X	X	..	..
7/8x										
36x120	37.260	1117.80	X	..	..	..	..	..	X	..
48x120	37.260	1490.40	X	..	..	..	..	..	..	..
48x240	37.260	2980.80	X	..	..	..	..	..	..	..
60x120	37.260	1863.00	X	..	..	..	..	..	..	..
60x240	37.260	3726.00	X	..	..	..	..	..	..	..
72x120	37.260	2235.60	X	..	..	..	..	..	..	..
72x240	37.260	4471.20	X	..	..	..	..	..	..	..
84x120	37.260	2608.20	X	..	..	..	..	..	..	..
84x240	37.260	5216.40	X	..	..	..	..	..	..	..
96x120	37.260	2980.80	X	..	..	..	..	..	..	..
96x240	37.260	5961.60	X	..	..	..	..	..	..	..
1x										
48x120	42.582	1703.28	X	X	X	X	X	X	X	..
48x240	42.582	3406.56	X	X	X	X	X	X	X	..
60x120	42.582	2129.10	X	X	X	X	X	X	X	..
60x240	42.582	4258.20	X	X	X	X	X	X	X	..
72x120	42.582	2554.92	X	X	X	X	X	X	X	..
72x240	42.582	5109.84	X	X	X	X	X	X	X	..
84x120	42.582	2980.74	X	X	X	X	X	X	X	..
84x240	42.582	5961.48	X	X	X	X	X	X	X	..
96x120	42.582	3406.56	X	X	X	X	X	X	X	..
96x240	42.582	6813.12	X	X	X	X	X	X	X	..
1 1/4x										
48x120	53.228	2129.12	X	X	..	X	..	X	X	..
48x240	53.228	4258.24	X	X	..	X	..	X	X	..
60x120	53.228	2661.40	X	X	..	X	..	X	X	..
60x240	53.228	5322.80	X	X	..	X	..	X	X	..
72x120	53.228	3193.68	X	X	..	X	..	X	..	..
72x240	53.228	6387.36	X	X	..	X	..	X	..	..
84x120	53.228	3725.96	X	..	..	X	..	X	..	..
84x240	53.228	7451.92	X	..	..	X	..	X	..	..

(Continued on page 132)

STAINLESS STEEL PLATES (Cont.)**Hot Rolled, Annealed and Pickled**

X = STOCKED SIZES

Thick- ness & Size, Inches	Approx. Wt. Lbs. per		TYPE							
	Sq. Ft.	Plate	304	304 ELC	310	316	316 ELC	321	347	410
1 1/4x										
96x120	53.228	4258.24	X	..	..	X	..	X	..	..
96x240	53.228	8516.48	X	..	..	X	..	X	..	..
1 1/2x										
48x120	63.873	2554.92	X	X	..	X	..	X	X	..
48x240	63.873	5109.84	X	X	..	X	..	X	..	..
60x120	63.873	3193.65	X	..	..	X	..	X	..	..
60x240	63.873	6387.30	X	..	..	X	..	X	..	..
72x120	63.873	3832.38	X	..	..	X	..	X	..	..
72x240	63.873	7664.66	X	..	..	X	..	X	..	..
84x120	63.873	4471.11	X	..	..	X	..	X	..	..
84x240	63.873	8942.22	X	..	..	X	..	X	..	..
96x120	63.873	5109.84	X	..	..	X	..	X	..	..
96x240	63.873	10219.68	X	..	..	X	..	X	..	..
1 3/4x										
48x120	74.519	2980.76	X	X	..	X	..	X	..	..
48x240	74.519	5961.52	X	..	..	X	..	X	..	..
60x120	74.519	3725.95	X	..	..	X	..	X	..	..
60x240	74.519	7451.90	X	..	..	X	..	X	..	..
72x120	74.519	4471.14	X	..	..	X	..	X	..	..
72x240	74.519	8942.28	X	..	..	X	..	X	..	..
84x120	74.519	5216.33	X	..	..	X	..	X	..	..
84x240	74.519	10432.66	X	..	..	X	..	X	..	..
96x120	74.519	5961.52	X	..	..	X	..	X	..	..
96x240	74.519	11923.04	X	..	..	X	..	X	..	..
2x										
48x120	85.164	3406.56	X	X	..	X	..	X	X	..
48x240	85.164	6813.12	X	X	..	X	..	X	..	..
60x120	85.164	4258.20	X	..	..	X	..	X	..	..
60x240	85.164	8516.40	X	..	..	X	..	X	..	..
72x120	85.164	5109.84	X	..	..	X	..	X	..	..
72x240	85.164	10219.68	X	..	..	X	..	X	..	..
84x120	85.164	5961.48	X	..	..	X	..	X	..	..
84x240	85.164	11922.96	X	..	..	X	..	X	..	..
96x120	85.164	6813.12	X	..	..	X	..	X	..	..
96x240	85.164	13626.24	X	..	..	X	..	X	..	..
2 1/2x										
48x120	106.450	4258.00	X	..	..	..	..	X	..	..
48x240	106.450	8516.00	X	..	..	..	..	X	..	..
3x										
48x120	127.750	5110.00	X	..	..	..	..	X	..	..
48x240	127.750	10220.00	X	X

STAINLESS STEEL WIRE, BARS, SHAFTING, ANGLES & BILLETS

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ESSENTIAL INFORMATION FOR STAINLESS STEEL ORDERS

1—SPECIFICATION

Number
Date
Grade
Condition
Finish

3—FABRICATION—BARS

Machining, turning, threading,
drilling, tapping, broaching.
Forging—Simple or severe
upsetting.
Cold Heading
Heat Treating

2—APPLICATION

How Used

4—INSPECTION

Where, when and by whom.

NOTE: Specify if for Ordnance requiring salt spray or any other testing or conditions not mentioned above. This refers to stainless bars, billets, sheet and strip requirements. For commercial requirements not covered by any Army, Navy or government specification, Paragraph No. 1 or Question No. 1, which covers Specification, can be eliminated, but commercial type number, physicals and surface finish must be included in its place.

Stainless
Wire, Bars

STAINLESS STEEL SPECIFICATIONS**IMPORTANT NOTICE**

1—Some specifications permit the use of several finishes and tempers. When ordering, purchaser should state finish desired.

2—These specifications often cover tolerances closer than commercial, resulting in higher prices than may be necessary. Unless close tolerances are required, commercial tolerances should be specified when ordering.

3—The AISI Type Number applies to the same general analysis, but does not always exactly agree with the analysis of Government specifications. This commercial type number is a guide to the applicable base price.

FEDERAL SPECIFICATIONS**QQ-S-763-b — BARS AND FORGINGS**

Class 302	Condition A	Class 321	Condition A
303	A	347	A
303Se	A & B	416	A & H
304	A	430F	A
304L	A	431	A
316	A	440C	A

AISI
Type Nos.
(Nearest)

QQ-W-423 — WIRE

Comp. FS-302 Cond. A.....	.....302 Wire
Comp. FS-302 Cond. B .....	.....302 H.P. Wire

MILITARY SPECIFICATIONS**MIL-S-7720**

Amend. 1

Comp. 302	Bars.....	302
Comp. 303S	Bars.....	303S
Comp. 303SE	Bars.....	303SE
Comp. 316	Bars.....	316

MIL-S-18732 (ASG) (AN-QQ-S-770)

Bars	431
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MIL-W-6713 (AN-W-24)

Wire	302
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AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 5610E	Bars and Forgings.....	416
AMS 5613D	Bars and Forgings.....	410
AMS 5616C	Bars and Forgings.....	418
AMS 5627	Bars and Forgings.....	430
AMS 5628B	Bars and Forgings.....	431
AMS 5630C	Bars and Forgings.....	440C
AMS 5637A	Bars and Forgings.....	302
AMS 5639A	Bars and Forgings.....	304
AMS 5640F	Bars and Forgings.....	303S or SE
AMS 5641A	Bars and Forgings.....	303SE
AMS 5642C	Bars and Forgings.....	347
AMS 5643E	Bars and Forgings.....	17-4PH
AMS 5644A	Bars and Forgings.....	17-7PH
AMS 5645F	Bars and Forgings.....	321
AMS 5646D	Bars and Forgings.....	347
AMS 5648C	Bars and Forgings.....	316
AMS 7472G	Wire	305

STAINLESS STEEL COLD HEADING WIRE

COPPERED, LIMED AND SOAP-COATED

Min.	Diam. Dec. Inch Max.	Min.	Diam. Dec. Inch Max.	Min.	Diam. Dec. Inch Max.
------	-------------------------	------	-------------------------	------	-------------------------

TYPE 302-304 MOD. — Spec. QQ-W-423 and AMS-5636

100 to 150 pound Coils — Double Paper Wrapped

.091.....	.093 | .121.....	.123 | .153.....	.155
-----------	------------------	------------------	------

TYPE 302-305 MOD. — Spec. AMS-7472G

Catchweight Coils — Paper Wrapped

.118.....	.120 | .222.....	.224 | .306.....	.309
.165.....	.167 | .244.....	.246 | .368.....	.371
.184.....	.186 | .249.....	.251 | .428.....	.431
.221.....	.223 | .277.....	.279	

TYPE 321 — Spec. AMS-5645G

Catchweight Coils — Paper Wrapped

.091.....	.093 | .184.....	.186 | .368.....	.371
.113.....	.115 | .222.....	.224 | .382.....	.385
.138.....	.140 | .243.....	.245 | .490.....	.493
.159.....	.161 | .303.....	.306 | .211.....	.213
.164.....	.166 | .306.....	.309 | .220.....	.222

TYPE 430 — Spec. AMS-5627

Catchweight Coils — Paper Wrapped

.091.....	.093 | .137.....	.139 | .183.....	.185
.113.....	.115 | .159.....	.161 | .211.....	.213
.130.....	.132 | .164.....	.166 | .220.....	.222

TYPE 431 — Spec. AMS-5628B

Catchweight Coils — Paper Wrapped

.127.....	.129 | .258.....	.260 | .374.....	.377
.151.....	.153 | .267.....	.269 | .381.....	.384
.173.....	.175 | .305.....	.308 | .428.....	.431
.184.....	.186 | .307.....	.309 | .466.....	.469
.190.....	.192 | .312.....	.315 | .490.....	.493
.205.....	.207 | .319.....	.321 | .553.....	.556
.243.....	.245 | .343.....	.347 | .613.....	.617
.250.....	.252 | .366.....	.369	

A-286 Consutrode — Spec. AMS-5737

A precipitation hardening Chrome Nickel Alloy which has very high strength at temperatures up to 1300° F.

Min.	Diam. Dec. Inch Max.	Min.	Diam. Dec. Inch Max.	Min.	Diam. Dec. Inch Max.
------	-------------------------	------	-------------------------	------	-------------------------

Approx. 150 pound Coils

Solution treated and 5% drawn on final pass. 120,000 Max. Tensile, aim 110,000.

.091.....	.093 | .124.....	.126 | .164.....	.166
.113.....	.115 | .149.....	.151 | .211.....	.213
.122.....	.124 | .153.....	.155	

Approx. 250 pound Coils

Solution treated and processed to paragraph 3.1 of AMS-7478.

.168.....	.170 | .285.....	.287 | .437.....	.440
.184.....	.186 | .306.....	.309 | .442.....	.444
.189.....	.191 | .312.....	.315 | .446.....	.448
.197.....	.199 | .319.....	.321 | .500.....	.503
.226.....	.228 | .347.....	.350 | .509.....	.513
.244.....	.246 | .368.....	.371 | .560.....	.564
.250.....	.252 | .375.....	.378 | .573.....	.576
.258.....	.260 | .383.....	.385 | .623.....	.627

TYPE 302 STAINLESS STEEL WIRE COILS**Spec. QQ-W-423 — Annealed, Cold Drawn****5 Lb. Non-Returnable Spools****Diameter, Decimal Inch: .020, .025, .032, .041, .050 & .063****25 Lb. Catchweight Coils****Diameter, Decimal Inch: .063****TYPE 302 STAINLESS STEEL HINGE PIN WIRE****Spec. QQ-W-423 Cond. B — Spring Tempered****Stock Lengths 144 Inches Exact**

Diameter Dec. Inch	Minimum Tensile	Approx. Wt. Lbs. per Lin. Ft.	Diameter Dec. Inch	Minimum Tensile	Approx. Wt. Lbs. per Lin. Ft.
.063	225,000	.010586	.125	193,000	.041675
.080	215,000	.017070	.130	193,000	.042750
.090	210,000	.021604	.180	173,000	.092890
.118	193,000	.040560			

STANDARD PERMISSIBLE VARIATIONS FOR DIMENSIONS IN STAINLESS STEEL BARS**ROUND BARS — Cold Drawn and Centerless Ground**

Up	Size Inches	Variations plus or minus	Size Inches		Variations plus or minus
			1 1/2 to 4	Over 4 to 4 1/2	
	to 5/16 exclusive	.0010			.0030
	5/16 to 1/2 exclusive	.0015			.0050
	1/2 to 1 exclusive	.0020			.0080
	1 to 1 1/2 exclusive	.0025			

HEXAGON BARS — Cold Drawn

Up	Size Inches	Plus	Minus	Variations plus or minus	
				1 1/2 to 4	Over 4 to 4 1/2
	to 5/16 exclusive	.0000	.0020		
	5/16 to 1/2 exclusive	.0000	.0030		
	1/2	.0000	.0040		
	1/2 to 1 exclusive	.0000	.0040		
	1 to 2 exclusive	.0000	.0060		
	2 to 3 exclusive	.0000	.0080		
	3	.0000	.0100		

SQUARE BARS — Cold Drawn

		Plus	Minus	
	5/16 to 1/2 exclusive	.0015	.0015	
	1/2 to 1 exclusive	.0020	.0020	
	1 to 1 1/2 exclusive	.0025	.0025	

HOT ROLLED BARS — Rounds and Squares

Size in Inches	Plus	Minus	Out of Round or Square	
			Over	Under
5/8 to 1 inclusive	.009	.009	.013	
Over 1 to 1 1/8 inclusive	.010	.010	.015	
Over 1 1/8 to 1 1/4 inclusive	.011	.011	.016	
Over 1 1/4 to 1 3/8 inclusive	.012	.012	.018	
Over 1 3/8 to 1 1/2 inclusive	.014	.014	.021	
Over 1 1/2 to 2 inclusive	1/64	1/64	.023	
Over 2 to 2 1/2 inclusive	1/32	.000	.023	
Over 2 1/2 to 3 1/2 inclusive	3/64	.000	.035	
Over 3 1/2 to 4 1/2 inclusive	1/16	.000	.046	
Over 4 1/2 to 5 1/2 inclusive	5/64	.000	.058	

FLATS — Hot Rolled

Width in Inches	VARIATIONS			From Width Over Under	
	From Thickness				
	Over 1/8 to 1/2 in. Incl.	Over 1/2 to 1 in. Incl.	Over 1 to 2 in. Incl.		
5/8 to 1 inclusive	.008	.010		1/64	
Over 1 to 2 inclusive	.012	.015	1/32	1/32	
Over 2 to 4 inclusive	.015	.020	1/32	1/16	
Over 4 to 6 inclusive	.015	.020	1/32	3/32	

STAINLESS STEEL BARS

**TYPE 302, Cond. B — Spec. QQ-S-763B, Cond. B
and AMS-5637A**

ROUND — ANNEALED AND COLD DRAWN

Stock Lengths — 12 Ft. — 0 + 1/4 In. Tolerance — Color Code — Yellow

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4 . . . . .	.167	5/16 . . . . .	.261	3/8 . . . . .	.376

TYPE 303 — Spec. MIL-S-7720, QQ-S-763B and AMS-5640F

FREE MACHINING — NOT SUITABLE FOR WELDING

Stock Lengths { Sizes 1/2 In. & Under, 12 Ft. — 0 + 1/4 In. Tolerance
{ Sizes Over 1/2 In., 12 to 14 Ft. Random

Type 303 is an 18-8 type stainless with machining speeds of 75% of those used for Bessemer screw stock. It is slightly less corrosion resistant than Type 302. The tensile strength and hardness of Type 303 can be improved by cold working.

Composition 303-Selenium, Condition A

Color Code — Pink

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — ANNEALED AND COLD DRAWN					
3/32 . . . . .	.023	7/32 . . . . .	.128	3/8 . . . . .	.376
1/8 . . . . .	.042	1/4 . . . . .	.167	13/32 . . . . .	.441
5/32 . . . . .	.065	9/32 . . . . .	.211	7/16 . . . . .	.511
3/16 . . . . .	.094	5/16 . . . . .	.261	1/2 . . . . .	.668

ROUND — ANNEALED AND CENTERLESS GROUNDED

1/8 . . . . .	.042	1 1/16	1.262	1 5/16	4.600
3/16 . . . . .	.094	3/4	1.502	1 3/8	5.049
1/4 . . . . .	.167	1 5/16	1.763	1 7/16	5.518
5/16 . . . . .	.261	7/8	2.044	1 1/2	6.009
3/8 . . . . .	.376	1 1/16	2.347	1 5/8	7.051
7/16 . . . . .	.511	1	2.670	1 3/4	8.178
1/2 . . . . .	.668	1 1/8	3.380	1 7/8	9.388
9/16 . . . . .	.845	1 3/16	3.766	2	10.680
5/8	1.043	1 1/4	4.172	2 1/4	13.519

HEXAGON — COLD DRAWN

3/16 . . . . .	.104	7/16 . . . . .	.564	1 1/16	1.392
1/4 . . . . .	.184	1/2 . . . . .	.736	3/4	1.656
5/16 . . . . .	.288	9/16 . . . . .	.932	13/16	1.940
7/16 . . . . .	.414	5/8	1.150	1	2.940

Composition 303-Selenium, Condition B, High Tensile

Color Code — Blue

Size Inches	Tensile Strength	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Tensile Strength	Approx. Wt. Lbs. per Lin. Ft.
ROUND — COLD DRAWN					
1/8	Min. 115000 P.S.I.	.042	5/8	Min. 115000 P.S.I.	1.043
3/16	Min. 115000 P.S.I.	.094	1 1/16	Min. 115000 P.S.I.	1.262
1/4	Min. 115000 P.S.I.	.167	3/4	Min. 115000 P.S.I.	1.502
5/16	Min. 115000 P.S.I.	.261	7/8	Min. 115000 P.S.I.	2.045
3/8	Min. 115000 P.S.I.	.376	1	Min. 115000 P.S.I.	2.670
7/16	Min. 115000 P.S.I.	.511	1 1/4	Min. 105000 P.S.I.	4.172
1/2	Min. 115000 P.S.I.	.668	1 5/16	Min. 105000 P.S.I.	5.518
9/16	Min. 115000 P.S.I.	.845	1 1/2	Min. 100000 P.S.I.	6.008

HEXAGON — COLD DRAWN

3/8	Min. 115000 P.S.I.	.414	5/8	Min. 115000 P.S.I.	.932
7/16	Min. 115000 P.S.I.	.564	5/8	Min. 115000 P.S.I.	1.150
1/2	Min. 115000 P.S.I.	.736	3/4	Min. 115000 P.S.I.	1.656

(Continued on page 138)

STAINLESS STEEL BARS

**TYPE 303 (Cont.) — Spec. MIL-S-7720, QQ-S-763B
and AMS-5640F**

FREE MACHINING — NOT SUITABLE FOR WELDING

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. — 0 + $\frac{1}{4}$ In. Tolerance
{ Sizes Over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Composition 303-Sulphur, Condition A

Color Code — Pink and Yellow

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
----------------	-------------------------------------	----------------	-------------------------------------	----------------	-------------------------------------

ROUND — ANNEALED AND COLD DRAWN

$\frac{1}{16}$	.010	$\frac{7}{32}$	.128	$\frac{3}{8}$	.376
$\frac{3}{32}$	.023	$\frac{1}{4}$	.167	.380	.386
$\frac{1}{8}$	.042	.255	.174	$\frac{1\frac{1}{2}}{32}$	.441
.130	.045	$\frac{9}{32}$	.211	$\frac{7}{16}$	.511
$\frac{5}{32}$	.065	$\frac{5}{16}$	.261	$\frac{1\frac{1}{2}}{32}$	.587
$\frac{3}{16}$	.094	.3175	.269	$\frac{1}{2}$	.668
.1925	.099	$\frac{1\frac{1}{2}}{32}$	.316	.505	.681

ROUND — ANNEALED — GROUNDED AND POLISHED

$\frac{1}{8}$	.042	$\frac{5}{16}$	.261	$\frac{7}{16}$	.511
$\frac{3}{16}$	.094	$\frac{11}{32}$	.316	$\frac{1}{2}$	.668
$\frac{1}{4}$	.167	$\frac{3}{8}$	.376		

ROUND — ANNEALED — PRECISION AND CENTERLESS GROUNDED

Tolerance: Plus or Minus .00025 Inch

$\frac{3}{32}$	.023	$\frac{7}{32}$	.128	$\frac{7}{16}$	.511
$\frac{1}{8}$	.042	$\frac{1}{4}$	.167	$\frac{1}{2}$	.668
$\frac{5}{32}$	.065	$\frac{5}{16}$	.261		
$\frac{3}{16}$	.094	$\frac{3}{8}$	.376		

ROUND — ANNEALED AND CENTERLESS GROUNDED

$\frac{1\frac{1}{2}}{32}$	.754	$1\frac{1}{2}$	6.009	$2\frac{5}{8}$	18.400
$\frac{9}{16}$	.845	$1\frac{1}{16}$	6.519	$2\frac{1}{16}$	19.290
$\frac{5}{8}$	1.043	$1\frac{5}{8}$	7.051	$2\frac{3}{4}$	20.195
$1\frac{1}{16}$	1.262	$1\frac{11}{16}$	7.604	$2\frac{7}{8}$	22.072
$\frac{3}{4}$	1.502	$1\frac{3}{4}$	8.178	$2\frac{15}{16}$	23.040
$1\frac{3}{16}$	1.763	$1\frac{13}{16}$	8.773	3	24.033
$\frac{7}{8}$	2.044	$1\frac{7}{8}$	9.388	$3\frac{1}{4}$	28.210
$1\frac{5}{16}$	2.347	$1\frac{15}{16}$	10.020	$3\frac{1}{2}$	32.712
1	2.670	2	10.680	$3\frac{3}{4}$	37.550
$1\frac{1}{16}$	3.015	$2\frac{1}{8}$	12.060	4	42.730
$1\frac{1}{8}$	3.380	$2\frac{3}{16}$	12.780	$4\frac{1}{4}$	48.230
$1\frac{3}{16}$	3.766	$2\frac{1}{4}$	13.519	$4\frac{1}{2}$	54.070
$1\frac{1}{4}$	4.172	$2\frac{5}{16}$	14.280	$4\frac{3}{4}$	60.250
$1\frac{5}{16}$	4.600	$2\frac{3}{8}$	15.060	5	66.760
$1\frac{3}{8}$	5.049	$2\frac{7}{16}$	15.870		
$1\frac{1}{16}$	5.518	$2\frac{1}{2}$	16.690		

ROUND — HOT ROLLED ANNEALED, FORGING QUALITY

3	24.033	$4\frac{1}{4}$	48.230	$4\frac{3}{4}$	60.250
$3\frac{1}{2}$	32.712	$4\frac{1}{2}$	54.070	$\dagger 5$	66.760
4	42.730				

HEXAGON — ANNEALED AND COLD DRAWN

$\frac{3}{16}$	.104	$\frac{13}{16}$	1.940	$1\frac{5}{8}$	7.770
$\frac{1}{4}$	.184	$\frac{7}{8}$	2.250	$1\frac{3}{4}$	9.017
$\frac{5}{16}$	.288	$\frac{15}{16}$	2.590	$1\frac{7}{8}$	10.350
$\frac{3}{8}$	.414	1	2.940	2	11.780
$\frac{7}{16}$	.564	$1\frac{1}{16}$	3.320	$2\frac{1}{8}$	13.300
$\frac{1}{2}$	.736	$1\frac{1}{8}$	3.730	$2\frac{1}{4}$	14.910
$\frac{9}{16}$	.932	$1\frac{1}{16}$	4.150	$2\frac{1}{2}$	18.400
$\frac{5}{8}$	1.150	$1\frac{1}{4}$	4.600	$2\frac{5}{8}$	20.290
$1\frac{1}{16}$	1.390	$1\frac{3}{8}$	5.570	$2\frac{3}{4}$	22.270
$\frac{3}{4}$	1.660	$1\frac{1}{2}$	6.630	$2\frac{7}{8}$	24.340

\dagger 3 to 5 Foot Random Lengths

(Continued on page 139)

STAINLESS STEEL BARS

TYPE 303 (Cont.) — Spec. MIL-S-7720, QQ-S-763B and AMS-5640F

FREE MACHINING — NOT SUITABLE FOR WELDING

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. — 0 + $\frac{1}{4}$ In. Tolerance
 { Sizes over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Composition 303-Sulphur, Condition A

Color Code — Pink and Yellow

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
SQUARE — ANNEALED AND COLD DRAWN					
$\frac{3}{16}$	.120	$\frac{1}{2}$	.850	$1\frac{1}{4}$	5.312
$\frac{1}{4}$	.213	$\frac{5}{8}$	1.328	$1\frac{1}{2}$	7.650
$\frac{5}{16}$	.332	$\frac{3}{4}$	1.913	$1\frac{5}{8}$	8.978
$\frac{3}{8}$	.478	$\frac{7}{8}$	2.603	$1\frac{3}{4}$	10.410
$\frac{7}{16}$	.651	1	3.400	2	13.600

TYPE 304 — Spec. QQ-S-763B Class 304 and AMS-5639A

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. — 0 + $\frac{1}{4}$ In. Tolerance
 { Sizes over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Color Code — Red

Because of its toughness and great ductility 18-8 can be severely worked in the cold state. Welds are generally as tough and ductile as the metal joined. 18-8 can be machined at speeds about 45% of Bessemer screw stock. It will retain an untarnished bright surface under normal atmospheric conditions.

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — ANNEALED AND COLD DRAWN					
$\frac{1}{8}$	.042	$\frac{5}{16}$	.261	$\frac{1}{2}$	.668
$\frac{3}{16}$	.094	$\frac{3}{8}$	.376		
$\frac{1}{4}$	.167	$\frac{7}{16}$	.511		

ROUND — ANNEALED AND CENTERLESS GROUND

$\frac{1}{16}$	.845	1	2.670	$1\frac{3}{4}$	8.178
$\frac{5}{16}$	1.043	$1\frac{1}{8}$	3.380	$1\frac{7}{8}$	9.388
$1\frac{1}{16}$	1.262	$1\frac{3}{16}$	3.760	2	10.680
$\frac{3}{4}$	1.502	$1\frac{1}{4}$	4.173	$2\frac{1}{4}$	13.520
$1\frac{15}{16}$	1.763	$1\frac{3}{8}$	5.049	$2\frac{1}{2}$	16.690
$\frac{7}{8}$	2.044	$1\frac{1}{2}$	6.009	$2\frac{3}{4}$	20.200
$1\frac{5}{16}$	2.347	$1\frac{5}{8}$	7.051	3	24.033

ROUND — HOT ROLLED, ANNEALED, FORGING QUALITY

$3\frac{1}{4}$	28.21	$4\frac{1}{4}$	48.23	$5\frac{1}{2}$	80.78
$3\frac{1}{2}$	32.71	$4\frac{1}{2}$	54.07	6	96.13
$3\frac{3}{4}$	37.55	$4\frac{3}{4}$	60.25		
4	42.73	5	66.76		

ROUND — HOT FORGED, ANNEALED, ROUGH TURNED

7	130.90	8	170.90		
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HEXAGON — ANNEALED AND COLD DRAWN

$\frac{7}{8}$	2.254	$1\frac{1}{16}$	3.324	$1\frac{1}{4}$	4.601
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RECTANGULAR — HOT ROLLED, ANNEALED AND PICKLED

Stock Lengths 12 to 14 Feet Random

$\frac{1}{8} \times \frac{1}{2}$	.213	$\frac{3}{16} \times 1\frac{1}{4}$	.797	$\frac{1}{4} \times 3$	2.55
$x \frac{3}{4}$	.319	$x 1\frac{1}{2}$	.956	$x 4$	3.40
$x 1$	.425	$x 2$	1.280	$\frac{3}{8} \times \frac{1}{2}$	.64
$x 1\frac{1}{4}$	.531	$x 2\frac{1}{2}$	1.590	$x \frac{3}{4}$	.96
$x 1\frac{1}{2}$	.638	$x 3$	1.910	$x 1$	1.28
$x 2$	.850	$\frac{1}{4} \times \frac{1}{2}$	.425	$x 1\frac{1}{4}$	1.59
$x 2\frac{1}{2}$	1.060	$x \frac{3}{4}$	.638	$x 1\frac{1}{2}$	1.91
$x 3$	1.280	$x 1$	.850	$x 2$	2.55
$\frac{3}{16} \times \frac{1}{2}$	.319	$x 1\frac{1}{4}$	1.060	$x 2\frac{1}{2}$	3.19
$x \frac{5}{8}$	.398	$x 1\frac{1}{2}$	1.280	$x 3$	3.83
$x \frac{3}{4}$	.478	$x 2$	1.70	$x 4$	5.10
$x 1$	.638	$x 2\frac{1}{2}$	2.13		

(Continued on page 140)

STAINLESS STEEL BARS

**TYPE 304 (Cont.) — Spec. QQ-S-763B Class 304 and
AMS-5639A**

Color Code — Red

Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.
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RECTANGULAR — HOT ROLLED, ANNEALED AND PICKLED (Cont.)

Stock Lengths 12 to 14 Feet Random

1/2x1	1.70	5/8x2	4.25	3/4x4	10.20
x1 1/4	2.13	x2 1/2	5.31	x5	12.75
x1 1/2	2.55	x3	6.38	x6	15.30
x2	3.40	x4	8.50	1 x2	6.80
x2 1/2	4.25	3/4x1	2.55	x2 1/2	8.50
x3	5.10	x1 1/2	3.83	x3	10.20
x3 1/2	5.95	x2	5.10	x4	13.60
x4	6.80	x2 1/2	6.38	x6	20.40
x6	10.20	x3	7.65		

HALF ROUND — COLD DRAWN

Stock Lengths 10 to 14 Feet Random

1/2x1/4334	5/8x5/16522
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ANGLES — HOT ROLLED, ANNEALED AND PICKLED

Stock Lengths 20 to 24 Feet Random

3/4x 3/4x1/8 .....	.59	1 1/2x1 1/2x3/16	1.80	2 1/2x2 1/2x3/16	3.07
1 x1 x1/8 .....	.80	x1/4	2.34	x1/4	4.10
x3/16	1.16	1 3/4x1 3/4x3/16	2.12	x3/8	5.90
x1/4	1.49	x1/4	2.77	3 x3 x1/4	4.90
1 1/4x1 1/4x1/4	1.92	2 x2 x3/16	2.44	x3/8	7.20
1 1/2x1 1/2x1/8	1.23	x1/4	3.19		

TYPE 302 HALF OVALS — Spec. MIL-S-7720, Amend. 1

Class 304

ANNEALED, COLD DRAWN — 10 to 14 Feet Random Lengths

Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.
3/16x3/4 .....	.334	1/4x1 .....	.594

TYPE 316 — Spec. MIL-S-7720, QQ-S-763B and AMS-5648C

Color Code — Green

Stock Lengths { 1/2 In. Dia. & Under, 12 Ft. -0 +1/4 In. Tolerance
{ Over 1/2 In. Dia., 12 to 14 Ft. Random

Produced to improve the corrosion resistance of the 18-8 types by the addition of Molybdenum. Nickel content has been increased to make this type more workable. These additions produce improved corrosion resistance, especially for use in the textile, paper and chemical industries. This grade resists pitting in certain corrosive media much better than the 18-8 stainless steels. Type 316 has the highest creep strength of any conventional stainless grade. It has a high short time tensile strength at elevated temperatures.

Type 316 is easily welded. It is recommended that the steel be annealed before welding to obtain maximum corrosion resistance.

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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ROUND — COLD DRAWN — ANNEALED

3/16094	5/16261	7/16511
1/4167	3/8376	1/2668

ROUND — CENTERLESS GROUND — ANNEALED

5/8	1.043	1 3/8	5.049	2 1/4	13.520
3/4	1.502	1 1/2	6.009	2 1/2	16.690
7/8	2.044	1 5/8	7.051	2 3/4	20.200
1	2.670	1 3/4	8.178	3	24.033
1 1/8	3.760	1 7/8	9.388		
1 1/4	4.173	2	10.680		

(Continued on page 141)

STAINLESS STEEL BARS

TYPE 316 (Cont.) — Spec. MIL-S-7720, QQ-S-763B and AMS-5648C

Color Code — Green

Stock Lengths { Sizes 1/2 In. & Under, 12 Ft. — 0 + 1/4 In. Tolerance
 { Sizes Over 1/2 In., 12 to 14 Ft. Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — HOT ROLLED, ANNEALED, FORGING QUALITY					
3	24.033	3 3/4	37.550	4 1/2	54.070
3 1/4	28.210	4	42.730	4 3/4	60.250
3 1/2	32.712	4 1/4	48.230		

HEXAGON — COLD DRAWN — ANNEALED

3/16	.104	1 1/16	1.940	1 1/2	6.630
1/4	.184	7/8	2.250	1 5/8	7.770
5/16	.288	1 5/16	2.590	1 3/4	9.017
3/8	.414	1	2.940	1 7/8	10.350
7/16	.564	1 1/16	3.320	2	11.780
1/2	.736	1 1/8	3.730	2 1/4	14.910
9/16	.956	1 3/16	4.150	2 3/8	16.610
5/8	1.150	1 1/4	4.600	2 1/2	18.400
1 1/16	1.390	1 5/16	5.072		
3/4	1.660	1 3/8	5.570		

TYPE 321 ROUND — Spec. QQ-S-763B and AMS-5645F

Color Code — Yellow and Brown

Stock Lengths { 1/2 In. Dia. & Under, 12 Ft. — 0 + 1/4 In. Tolerance
 { Over 1/2 In. Dia., 12 to 14 Ft. Random

A Titanium "stabilized" grade produced to eliminate intergranular corrosion by the prevention of harmful chromium carbide precipitation. It is used where continuous service in the carbide precipitation range will not permit the use of welded low carbon (Type 304). For immunity to intergranular corrosion in service below 800°F. Types 302 and 304 must be annealed at 1950°F. after welding. Type 321 makes this high temperature anneal unnecessary. Use of Type 321 will not eliminate a lower temperature stress relieving anneal when this is required.

Type 321 is used for aircraft jet engine parts, rocket engines, guided missiles, exhaust collector rings for airplane engines, in industrial applications subjected to temperatures in the carbide precipitation range, and in chemical equipment that must be field welded without subsequent heat treatment. This type adapts itself well to deep drawing and drop hammer operations.

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
COLD DRAWN — ANNEALED					
3/16	.094	5/16	.261	7/16	.511
1/4	.167	3/8	.376	1/2	.668

CENTERLESS GROUND — ANNEALED

.260	.181	.635	1.077	1 1/4	4.172
.385	.396	3/4	1.502	1 3/8	5.049
.4475	.535	1 1/16	1.763	1 1/2	6.009
.510	.695	7/8	2.044	1 5/8	7.501
5/16	.845	1	2.670	1 3/4	8.178
5/8	1.043	1 1/8	3.380		

HOT ROLLED, ANNEALED, FORGING QUALITY

1 3/4	8.178	2 3/4	20.195	4 3/4	60.250
2	10.681	3	24.033	5	66.760
2 1/4	13.519	3 1/2	32.712	5 1/2	80.780
2 3/8	15.060	4	42.730	6	96.130
2 1/2	16.690	4 1/2	54.040		

STAINLESS STEEL BARS**TYPE 347 — Spec. QQ-S-763B and AMS-5646D**

Color Code — Red and Yellow

Stock Lengths	Rounds Hexagon Squares	{	Sizes $\frac{1}{2}$ In. & Under, 12 Ft. — 0 + $\frac{1}{4}$ In. Tolerance
			Sizes over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Rectangular — 12 to 14 Ft. Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
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ROUND — COLD DRAWN — ANNEALED

$\frac{1}{4}$167	$\frac{1}{2}$668		
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ROUND — CENTERLESS GROUND — ANNEALED

$\frac{5}{8}$	1.043	1	2.670	$\frac{1}{2}$	6.009
$\frac{3}{4}$	1.502	$\frac{1}{4}$	4.172		
$\frac{7}{8}$	2.044	$\frac{1}{8}$	5.049		

ROUND — HOT ROLLED, ANNEALED, FORGING QUALITY

$1\frac{3}{4}$	8.178	$2\frac{3}{4}$	20.195	5	66.760
2	10.681	3	24.033	$5\frac{1}{2}$	80.780
$2\frac{1}{4}$	13.519	$3\frac{1}{2}$	32.712	6	96.130
$2\frac{1}{2}$	16.690	4	42.730		

ROUND — HOT FORGED, ANNEALED AND ROUGH TURNED

7	130.900	8	170.900		
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HEXAGON — COLD DRAWN — ANNEALED

$\frac{1}{4}$1840	1	2.944	2	11.780
$\frac{1}{2}$7361	$\frac{1}{4}$	4.601		
$\frac{3}{4}$	1.656	$\frac{1}{2}$	6.626		

SQUARE — COLD DRAWN — ANNEALED

$\frac{1}{4}$ . . . . .	.213	$\frac{3}{4}$	1.913	$1\frac{1}{4}$	5.312
$\frac{1}{2}$ . . . . .	.850	1	3.400	$1\frac{1}{2}$	7.650

RECTANGULAR — ROT ROLLED, ANNEALED AND PICKLED

$\frac{1}{4} \times 1\frac{1}{4}$	1.060	$\frac{3}{4} \times 1$	2.55	$1\frac{1}{2} \times 2$	10.20
$\frac{1}{2} \times 1$	1.70	$1 \times 1\frac{1}{2}$	5.10		

TYPE 347F — Spec. AMS-5642C — Free Machining

Color Code — Black and White

Stock Lengths	{	Sizes $\frac{1}{2}$ In. & Under, 12 Ft. — 0 + $\frac{1}{4}$ In. Tolerance
		Sizes Over $\frac{1}{2}$ In., 12 to 14 Ft. Random

ROUND — CENTERLESS GROUND — ANNEALED

Diameter		inch	$\frac{7}{16}$	$\frac{9}{16}$
Approx. Wt. per Lin. Ft.		pound511	.845

HEXAGON — COLD DRAWN — ANNEALED

Size, inch	$\frac{5}{16}$	Approx. Wt. per Lin. Ft.288 Lb.
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TYPE 416 PRECISION PUMP SHAFTING

Spec. Will Meet Chemical Spec. QQ-S-763-B-Class 416-Type E;

But Sometimes Will Not Meet Physical.

Tensile Strength — Min. Ult. 100,000 P.S.I. Aim 110,000 to 120,000 P.S.I.

Straightness Tolerance — .005 in 10 Feet Aim .005 in 20 Feet — When Supported on V Rolls, 6 Inches from Each End and in the Center. Our Stock Checked by this Method on a 25 Foot Precision Ground Table Surface.

Stock Lengths — 20 Feet $\frac{1}{4}$ Inch to 22 Feet $\frac{1}{4}$ Inch

Available in 28 to 30 Foot Random Lengths

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
$\frac{3}{4}$	1.502	$1\frac{1}{16}$	5.518	$2\frac{7}{16}$	15.870
$\frac{7}{8}$	2.044	$1\frac{1}{2}$	6.009	$2\frac{11}{16}$	19.290
$1\frac{5}{16}$	2.347	$1\frac{1}{8}$	7.051	$2\frac{15}{16}$	23.040
1	2.670	$1\frac{11}{16}$	7.604	$3\frac{3}{16}$	27.130
$1\frac{3}{16}$	3.766	$1\frac{15}{16}$	10.020	$3\frac{7}{16}$	31.554
$1\frac{1}{4}$	4.172	$2\frac{3}{16}$	12.780	$3\frac{11}{16}$	36.310

STAINLESS STEEL BARS

**TYPE 416 COND. A — Spec. QQ-S-763B, Class 416 and
ASM-5610E**

Color Code — Brown

Suitable for Automatic Screw Machines

The machining speed of Type 416 approaches 85% of the speeds used for Bessemer screw stock. Short, brittle chips are characteristic of this grade. It has good corrosion resistance to attack from the atmosphere, food acids, fresh water and neutral or basic salts. Welding characteristics are poor, the welds having a tendency to be brittle and to crack.

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. —0 + $\frac{1}{4}$ In. Tolerance
{ Sizes Over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — COLD DRAWN — ANNEALED					
$\frac{1}{8}$	.042	$\frac{1}{4}$	.167	$\frac{7}{16}$	.511
$\frac{5}{32}$	.065	$\frac{17}{64}$	.192	$\frac{1}{2}$	.668
$\frac{3}{16}$	.094	$\frac{5}{16}$	.261		
$\frac{7}{32}$	.128	$\frac{3}{8}$	.376		

ROUND — CENTERLESS GROUND — ANNEALED

$\frac{9}{16}$	.845	$\frac{11}{16}$	4.172	$2\frac{1}{8}$	12.060
$\frac{5}{8}$	1.043	$1\frac{5}{16}$	4.600	$2\frac{1}{4}$	13.519
$1\frac{1}{16}$	1.262	$1\frac{3}{8}$	5.049	$2\frac{5}{16}$	14.280
$\frac{3}{4}$	1.502	$1\frac{7}{16}$	5.518	$2\frac{3}{8}$	15.060
$1\frac{3}{16}$	1.763	$1\frac{1}{2}$	6.009	$2\frac{1}{2}$	16.690
$\frac{7}{8}$	2.044	$1\frac{9}{16}$	6.519	$2\frac{5}{8}$	18.400
$1\frac{5}{16}$	2.347	$1\frac{5}{8}$	7.051	$2\frac{3}{4}$	20.195
1	2.670	$1\frac{3}{4}$	8.178	3	24.033
$1\frac{1}{16}$	3.015	$1\frac{7}{8}$	9.388		
$1\frac{1}{8}$	3.380	2	10.681		

HEXAGON — COLD DRAWN — ANNEALED

$\frac{3}{4}$	1.656	1	2.944
$\frac{7}{8}$	2.254	$1\frac{1}{8}$	3.726

**TYPE 416 — Cond. Heat Treated — Spec. QQ-S-763B,
Class 416**

Heat Treated to: 120,000 Min. Tensile Strength

Hardness: Rockwell C34 — Brinell 321 Max.

Color Code — Brown and White

Stock Lengths { $\frac{1}{2}$ In. Dia. & Under, 12 Ft. —0 + $\frac{1}{4}$ In. Tolerance
{ Over $\frac{1}{2}$ In. Dia., 12 to 14 Ft. Random

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — COLD DRAWN					
$\frac{3}{32}$	.023	$\frac{9}{32}$	.211	$\frac{7}{16}$	.511
$\frac{3}{16}$	.094	$\frac{5}{16}$	.261	$.438$	.512
$\frac{1}{4}$	.167	$\frac{3}{8}$	.376	$\frac{1}{2}$	.668

ROUND — CENTERLESS GROUND

$\frac{3}{32}$	.023	$1\frac{1}{16}$	1.262	$1\frac{3}{4}$	8.178
$\frac{1}{8}$	.042	$\frac{3}{4}$	1.502	$1\frac{7}{8}$	9.388
$\frac{5}{32}$	.065	$1\frac{15}{16}$	1.763	$1\frac{15}{16}$	10.024
$\frac{3}{16}$	.094	$\frac{7}{8}$	2.044	2	10.681
$\frac{7}{32}$	.128	$1\frac{5}{16}$	2.347	$2\frac{1}{8}$	12.060
$\frac{1}{4}$	.167	1	2.670	$2\frac{3}{8}$	12.778
$\frac{9}{32}$	.211	$1\frac{1}{16}$	3.015	$2\frac{1}{4}$	13.519
$\frac{5}{16}$	.261	$1\frac{7}{8}$	3.380	$2\frac{1}{2}$	16.690
$\frac{3}{8}$	.376	$1\frac{3}{16}$	3.766	$2\frac{3}{4}$	20.195
$\frac{7}{16}$	.511	$1\frac{1}{4}$	4.172	3	24.033
.438	.512	$1\frac{5}{16}$	4.600	$3\frac{1}{4}$	28.210
$\frac{1}{2}$	.668	$1\frac{3}{8}$	5.049	4	42.730
$\frac{9}{16}$	.845	$1\frac{1}{2}$	6.009		
$\frac{5}{8}$	1.043	$1\frac{5}{8}$	7.051		

STAINLESS STEEL BARS**TYPE 430 ROUND****Spec. QQ-S-763B, Class 430, Cond. A**

Color Code — Red and White

Stock Lengths — 12 Ft. — 0 + 1/4 In. Tolerance

CENTERLESS GROUND — ANNEALED

Diameter, Inch — 3/8 Approx. Wt. Per Lin. Ft. — 1.043 Lbs.

TYPE 430F ROUND**Spec. QQ-S-763B, Class 430F, Cond. A**

Color Code — Red and Blue

Stock Lengths { 1/2 In. Dia. & Under, 12 Ft. — 0 + 1/4 In. Tolerance
Over 1/2 In. Dia., 12 to 14 Ft. Random

Type 430F has an addition of sulphur which raises the cutting speed of regular 430 from 55% of Bessemer screw stock to 85% or higher. Even though sulphur is increased there is no appreciable loss in corrosion resistance. However, 430F sacrifices the good cold forming properties of 430 to obtain its high machinability.

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
COLD DRAWN — ANNEALED			
1/8	.042	5/16	.261
5/32	.065	3/8	.376
3/16	.094	7/16	.511
7/32	.128	1/2	.668
1/4	.167		
CENTERLESS GROUND — ANNEALED			
9/16	.845	7/8	2.044
5/8	1.043	1	2.670
3/4	1.502		

TYPE 431 — Spec. QQ-S-763B, MIL-S-18732 and DMS-1565B

Above Spec. Qualifies This Steel As Being

"Free of Banded Ferrite" and "Magna Flux Inspected."

Color Code — Black

Stock Lengths — Round { 1/2 In. Dia. & Under, 12 Ft. — 0 + 1/4 In. Tolerance
Over 1/2 In. Dia., 12 to 14 Ft. Random

Rectangles — 12 to 14 Ft. Random

This grade has high strength in both the annealed and heat treated conditions, as well as the best corrosion resistance of any of the martensitic grades of stainless steel.

Type 431 may be heat-treated to about 400 Brinell, retaining good ductility, but cannot be annealed lower than about 250 Brinell. It has been found increasingly useful for aircraft, marine, and oil industry products, such as forgings, nuts and bolts; also similar applications requiring a combination of high strength, toughness and resistance to attack in salt spray. Machining speeds are about 50% of those used for Bessemer screw stock.

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4	.167	3/8	.376	1/2	.668
5/16	.261	7/16	.511		

ROUND — COLD DRAWN — ANNEALED

1/4	.167	3/8	.376	1/2	.668
5/16	.261	7/16	.511		

(Continued on page 145)

STAINLESS STEEL BARS (Cont.)

TYPE 431 — Spec. QQ-S-763B, MIL-S-18732 and DMS-1565B

Above Spec. Qualifies This Steel As Being

"Free of Banded Ferrite" and "Magna Flux Inspected."

Color Code — Black

Stock Lengths — Rounds { ^{1/2 In. Dia. & Under, 12 Ft. — 0 + 1/4 In. Tolerance}
^{Over 1/2 In. Dia., 12 to 14 Ft. Random}

Rectangles — 12 to 14 Ft. Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — CENTERLESS GROUND — ANNEALED					
.510.....	.695	1	2.670	2	10.680
5/16.....	.845	1.010.....	2.724	2 1/4.....	13.519
5/8.....	1.043	1 1/8.....	3.380	2 1/2.....	16.690
.635.....	1.077	1 1/4.....	4.172	2 3/4.....	20.195
1 1/16.....	1.262	1.260.....	4.600	3	24.033
3/4.....	1.502	1 3/8.....	5.049	3 1/4.....	28.210
.760.....	1.542	1 1/2.....	6.009	3 1/2.....	32.712
7/8.....	2.044	1 5/8.....	7.051	4	42.730
.885.....	2.091	1 3/4.....	8.178	4 1/2.....	54.070
1 5/16.....	2.347				

ROUND — HOT ROLLED ANNEALED — FORGING QUALITY

1 3/4.....	8.178	2 5/8.....	18.400	3 1/2.....	32.712
1 7/8.....	9.388	2 3/4.....	20.195	4 1/2.....	54.070
2 3/8.....	15.060	3	24.033	5	66.760
2 1/2.....	16.690	3 1/4.....	28.210	5 1/2.....	80.780

RECTANGULAR — HOT ROLLED ANNEALED — PICKLED

3/8x1.....	1.280	1/2x1 3/4.....	2.975	1 1/4x2 1/4.....	9.560
3/8x1 1/4.....	1.594	5/8x1 1/2.....	3.188		
3/8x1 3/8.....	1.753	3/4x1 3/4.....	4.463		

**TYPE 440C ROUND — Spec. QQ-S-763B, Class 440C
and AMS-5630C**

Color Code — Red and Black

Stock Lengths { ^{1/2 In. Dia. & Under, 12 Ft. — 0 + 1/4 In. Tolerance}
^{Over 1/2 In. Dia., 12 to 14 Ft. Random}

This alloy has excellent edge retaining qualities and is extensively used for knife blades, surgical, dental tools and valve parts. It can be heat treated to the greatest hardness of any type of stainless steel.

It is magnetic under all conditions.

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
COLD DRAWN — ANNEALED					
1/4.....	.167	3/8.....	.376	1/2.....	.668
5/16.....	.261	7/16.....	.511		

CENTERLESS GROUND — ANNEALED

5/16.....	.845	3/4.....	1.502	1 1/4.....	4.172
5/8.....	1.043	7/8.....	2.044	1 1/2.....	6.009
1 1/16.....	1.262	1	2.670		

HOT ROLLED ANNEALED — FORGING QUALITY

1 3/4.....	8.178	2 1/4.....	13.519	2 3/4.....	20.195
2	10.680	2 1/2.....	16.690	3	24.033

TYPE 440F ROUND

Spec. QQ-S-763B, Class 440F Selenium

Color Code — Red and Green

Stock Lengths — 12 Ft. — 0 + 1/4 In. Tolerance

CENTERLESS GROUND — ANNEALED

Diameter Inches — 5/16 Approx. Wt. Per Ft. — .261 Lbs.

Diameter Inches — 7/16 Approx. Wt. Per Ft. — .511 Lbs.

A-286 STAINLESS STEEL BARS

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. - 0 + $\frac{1}{4}$ In. Tolerance
 { Sizes Over $\frac{1}{2}$ In., 12 to 14 Ft. Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — AIR MELTED — CENTERLESS GROUND					
Spec. AMS-5736 — Solution Treated Only — Suitable for Screw Machine Work or Hot Heading					
.260	.181	.510	.695	.885	2.091
.3225	.278	.5725	.875	1.010	2.724
.385	.396	.635	1.077	1.135	3.440
.4475	.535	.760	1.542		

ROUND — VACUUM MELTED — CENTERLESS GROUND

Spec. AMS-5737B	Solution Treated and Aged — Designed for Screw Machine Work
$\frac{1}{4}$	.167
$\frac{5}{16}$	.261
$\frac{3}{8}$	.376
$\frac{7}{16}$	.511
$\frac{1}{2}$	.668
$\frac{9}{16}$	.845
$\frac{5}{8}$	1.043
$1\frac{1}{16}$	1.262
$\frac{3}{4}$	1.502
$1\frac{1}{8}$	1.763
$1\frac{3}{8}$	2.044
$1\frac{5}{16}$	2.347
$1\frac{1}{4}$	
$1\frac{1}{2}$	
$1\frac{3}{4}$	
$1\frac{5}{8}$	
$1\frac{7}{8}$	
$2\frac{1}{8}$	
$2\frac{3}{8}$	
$2\frac{5}{8}$	
$2\frac{7}{8}$	
3	
$3\frac{1}{4}$	
$3\frac{1}{2}$	
$3\frac{3}{4}$	
4	
$4\frac{1}{2}$	
5	
$5\frac{1}{2}$	

HEXAGON — AIR MELTED — ANNEALED — COLD DRAWN

Spec. AMS-5735 — Solution Treated and Aged

$\frac{7}{8}$ 2.254

17-4PH STAINLESS STEEL BARS

Spec. AMS-5643E Cond. A, MB-0160-003

(Spec. LB-0160-133 Also Applies to Bars Under 3 Inches)

Color Code — Blue and Gold

Stock Lengths { Sizes $\frac{1}{2}$ In. & Under, 12 Ft. - 0 + $\frac{1}{4}$ In. Tolerance
 { Sizes Over $\frac{1}{2}$ In., 12 to 14 Ft. Random

17-4 PH is a precipitation hardening stainless steel that has gained wide acceptance for many uses.

It has a combination of high-strength and corrosion resistance (approaching Type 302). Its low-temperature heat treatment makes it an alloy of importance to designers and engineers.

17-4 PH has excellent welding characteristics, is a forgeable grade, machines well (similar to Type 410), does not distort in heat-treatment. This material can be heat-treated to 180,000 minimum tensile; 165,000 minimum yield strength.

17-4 PH retains a high strength level at temperatures around 600°F.

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
ROUND — CENTERLESS GROUND — ANNEALED					
$\frac{1}{8}$	.042	1	2.670	$2\frac{1}{4}$	13.519
$\frac{3}{16}$	.094	$1\frac{1}{16}$	3.015	$2\frac{3}{8}$	15.060
$\frac{1}{4}$	.167	$1\frac{1}{8}$	3.380	$2\frac{1}{2}$	16.690
$\frac{5}{16}$	.261	$1\frac{3}{16}$	3.766	$2\frac{5}{8}$	18.400
$\frac{3}{8}$	.376	$1\frac{1}{4}$	4.172	$2\frac{3}{4}$	20.195
$\frac{7}{16}$	.511	$1\frac{5}{16}$	4.600	$2\frac{7}{8}$	22.072
$\frac{1}{2}$	.668	$1\frac{3}{8}$	5.049	3	24.033
$\frac{9}{16}$	.845	$1\frac{1}{2}$	6.009	$3\frac{1}{4}$	28.210
$\frac{5}{8}$	1.043	$1\frac{5}{8}$	7.051	$3\frac{1}{2}$	32.712
$1\frac{1}{16}$	1.262	$1\frac{3}{4}$	8.178	$3\frac{3}{4}$	37.550
$\frac{3}{4}$	1.502	$1\frac{7}{8}$	9.388	4	42.730
$1\frac{3}{16}$	1.763	2	10.680	$4\frac{1}{2}$	54.070
$\frac{7}{8}$	2.044	$2\frac{1}{16}$	11.360	5	66.760
$1\frac{5}{16}$	2.347	$2\frac{1}{8}$	12.060	$5\frac{1}{2}$	80.780

HEXAGON — COLD DRAWN — ANNEALED

$\frac{1}{2}$	.736	$1\frac{1}{4}$	4.601	$2\frac{1}{2}$	18.400
$\frac{5}{8}$	1.150	$1\frac{1}{2}$	6.626	$2\frac{3}{4}$	22.270
$\frac{3}{4}$	1.656	$1\frac{3}{4}$	9.018	3	26.500
$\frac{7}{8}$	2.254	2	11.780	$3\frac{1}{2}$	36.070
1	2.944	$2\frac{1}{4}$	14.910		

†Hot Rolled — Annealed — Forged and Pickled

STAINLESS STEEL FORGING BILLETS

ROUND CORNERED SQUARE

Stock Lengths 10 to 14 Feet Random

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
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Type 303 — Sulphur Hot Forged — Not Annealed**Spec. QQ-S-763B Chem. only and AMS-5640E**

Color Code — Pink and Yellow

4.....	54.40	6.....	122.40
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Type 304 — Hot Forged — Not Annealed**Spec. QQ-S-763B, Cl. 304 Chem. only and AMS-5639**

Color Code — Red

4.....	54.40	8.....	217.60
6.....	122.40	10.....	340.00

Type 316 — Hot Forged — Not Annealed**Spec. MIL-S-7720 — AMEND. 1**

Color Code — Green

4.....	54.40	8.....	217.60
6.....	122.40	10.....	340.00

Type 321 — Hot Forged — Not Annealed**Spec. QQ-S-763B Chem. only and AMS-5645F**

Color Code — Yellow and Brown

4.....	54.40	8.....	217.60
6.....	122.40	10.....	340.00

Type 347 — Hot Forged — Not Annealed**Spec. QQ-S-763B Chem. only and AMS-5646D**

Color Code — Red and Yellow

4.....	54.40	8.....	217.60
6.....	122.40	10.....	340.00

Type 410 — Not Annealed**Spec. QQ-S-763B Chem. only and AMS-5613C**

Color Code — Green and White

4.....	54.40	12.....	489.60
8.....	217.60	12.....	489.60

17-4PH — Overaged for Forging**Spec. AMS-5643D and NA-2-70008C**

Color Code — Blue and Gold

4.....	54.40	8.....	217.60
6.....	122.40	12.....	489.60

17-7PH — Hot Forged — Not Annealed**Spec. AMS-5644**

Color Code — Red and White

4.....	54.40	8.....	217.60
6.....	122.40	12.....	489.60

STAINLESS LITERATURE

Complete technical data on the fabrication of stainless steel is available through your nearest Ducommun office.

STAINLESS STEELS

PROPERTIES OF 200 AND 300 SERIES

A.I.S.I. TYPE NUMBER	201	202	301
PRINCIPAL ALLOYING ELEMENTS, %	C 0.15 Max. Mn 5.50- 7.50 Si 1.00 Max. Cr 16.00-18.00 Ni 3.50- 5.50 N 0.25 Max.	C 0.15 Max. Mn 7.50-10.00 Si 1.00 Max. Cr 17.00-19.00 Ni 4.00- 6.00 N 0.25 Max.	C 0.15 Max. Mn 2.00 Max. Si 1.00 Max. Cr 16.00-18.00 Ni 6.00- 8.00
PHYSICAL PROPERTIES			
Density, lb./cu. in.	0.29	0.29	0.29
Mod. of Elasticity in Tension x 10 ⁶ lb./sq. in.	28.0	28.0	28.0
Structure	Austenitic	Austenitic	Austenitic
Specific Heat, B.t.u./° F./lb./32-212° F.	0.12	0.12	0.12
Thermal Conductivity, { 212° F. B.t.u./sq. ft./hr./° F./ft. } { 932° F.	9.4 —	9.4 —	9.4 12.4
Mean Coefficient of Thermal Expansion per ° F. x 10 ⁻⁶	{ 32-212° F. 32-600° F. 32-1000° F. 32-1200° F. }	{ 8.7 9.7 10.2 — }	{ 9.7 10.2 10.7 11.0 }
Melting Range	2550-2650° F.	2550-2650° F.	2550-2590° F.
ELECTRICAL PROPERTIES			
Magnetic Permeability, Annealed Elec. Resistivity, microhm-cm, 70° F.	Non-magnetic $\mu = 1.02$ 69.0	Non-magnetic $\mu = 1.008$ 69.0	Non-magnetic $\mu = 1.02$ 72.0
MECHANICAL PROPERTIES			
Brinell Hardness { Annealed Heat Treated (Bars) Cold Drawn	— — —	— — —	135-185 — 210-330
Rockwell Hardness { Annealed Heat Treated (Sheet or Strip) Cold Rolled	87-92 RB — —	85-90 RB — —	75-85 RB { 25-45 RC (1/4 to full hard)
Ultimate Tensile Strength, lbs./sq. in.	{ Annealed Heat Treated Cold Worked ⁽²⁾	100,000-125,000 — —	95,000-115,000 — —
Yield Strength, lbs./sq. in.	{ Annealed Heat Treated Cold Worked ⁽²⁾	45,000-65,000 — —	40,000-60,000 — —
Elongation in 2 inches	{ Annealed Heat Treated Cold Worked ⁽²⁾	50-60% — —	50-60% — —
Reduction of Area	{ Annealed Heat Treated Cold Worked ⁽²⁾	— — —	65-55% { 25-8% (1/4 to full hard) — 70-60% (Bar) — —
Impact Strength, Izod Value, ft. lbs.	{ Annealed Heat Treated	120-100 —	120-100 —
Ductility, Annealed—Olsen, inches	0.425-0.500	0.400-0.450	0.425-0.500
Creep Strength, Life of 10,000 hrs. with 1% Elongation, lb./sq. in.	{ At 1000° F. At 1100° F. At 1200° F. At 1300° F.	— — — —	— — — —
Strength at Elevated Temps., Short Time Tests, lb./sq. in.	{ 1300° F. 1500° F. 1700° F.	— — —	— — —
HEAT TREATMENT			
Full Anneal	Cool rapidly from 1850-2050° F.	Cool rapidly from 1850-2050° F.	Cool rapidly from 1850-2050° F.
Process Anneal	Same as full	Same as full	Same as full
Hardening—Quench from	Non-hardening	Non-hardening	Non-hardening
Tempering	Non-hardening	Non-hardening	Non-hardening
Initial Forging { Start Finish	2200° F. Over 1700° F.	2200° F. Over 1700° F.	2200° F. Over 1700° F.
HEAT RESISTANCE			
Scaling Temperature { Continuous Service Intermittent Service	1550° F. 1400° F.	1550° F. 1400° F.	1650° F. 1500° F.
WELDING PROPERTIES	Very good Tough welds	Very good Tough welds	Very good Tough welds
MACHINING PROPERTIES, Compared to Bessemer Screw Stock No. B1112	About 45%	About 45%	About 45%
DRAWING OR STAMPING	Good	Good	Good

⁽²⁾Values apply to cold rolled sheet and strip in the 300 Series except Type 303 where values apply to annealed and cold drawn 1 inch diameter bar.

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STAINLESS STEELS

PROPERTIES OF 200 AND 300 SERIES (Cont.)

302	302B	303	304	304L	305
C 0.15 Max. Mn 2.00 Max. Si 1.00 Max. Cr 17.00-19.00 Ni 8.00-10.00	C 0.15 Max. Mn 2.00 Max. Si 2.00- 3.00 Cr 17.00-19.00 Ni 8.00-10.00	C 0.15 Max. Mn 2.00 Max. Si 1.00 Max. Cr 17.00-19.00 Ni 8.00-10.00 S or Se 0.15 Min. Mo or Zr 0.60 Max.	C 0.08 Max. Mn 2.00 Max. Si 1.00 Max. Cr 18.00-20.00 Ni 8.00-12.00	C 0.03 Max. Mn 2.00 Max. Si 1.00 Max. Cr 18.00-20.00 Ni 8.00-12.00	C 0.12 Max. Mn 2.00 Max. Si 1.00 Max. Cr 17.00-19.00 Ni 10.00-13.00
0.29	0.29	0.29	0.29	0.29	0.29
28.0	28.0	28.0	28.0	28.0	28.0
Austenitic	Austenitic	Austenitic	Austenitic	Austenitic	Austenitic
0.12	0.12	0.12	0.12	0.12	0.12
9.4	9.4	9.4	9.4	9.4	9.4
12.4	12.5	12.4	12.4	12.4	12.4
9.6	9.0	9.6	9.6	9.6	9.6
9.9	10.0	9.9	9.9	9.9	9.9
10.2	10.8	10.2	10.2	10.2	10.2
10.4	11.2	10.4	10.4	10.4	10.4
2550-2590° F.	2500-2550° F.	2550-2590° F.	2550-2650° F.	2550-2650° F.	2550-2650° F.
Non-magnetic $\mu=1.008$ 72.0	Non-magnetic — 72.0	Non-magnetic $\mu=1.008$ 72.0	Non-magnetic $\mu=1.008$ 70.0	Non-magnetic $\mu=1.008$ 70.0	Non-magnetic $\mu=1.008$ 72.0
135-185	150-180	130-180	130-150	125-145	—
130-330	—	180-330	180-330	—	—
70-90 RB	75-90 RB	70-90 RB	70-90 RB	70-85 RB	70-90 RB
10-35 Rc	—	—	10-35 Rc	—	—
75,000-100,000	80,000-100,000	75,000-100,000	70,000-95,000	70,000-80,000	70,000-90,000
100,000-180,000	—	100,000-180,000	100,000-180,000	—	—
30,000-55,000	35,000-50,000	30,000-55,000	25,000-50,000	25,000-45,000	25,000-45,000
50,000-150,000	—	60,000-100,000	50,000-150,000	—	—
60-50%	60-50%	60-50%	65-50%	65-50%	55-45%
50-10%	—	45-30%	50-10%	—	—
75-55% (Bar)	70-50% (Bar)	65-50% (Bar)	75-60% (Bar)	75-65% (Bar)	—
—	—	60-45%	—	—	—
120-100	100-80	100-70	120-100	120-100	120-100
0.400-0.450	—	—	0.400-0.450	—	0.400-0.450
17,000	—	16,500	17,000	—	—
12,000	—	11,500	12,000	—	—
7,000	7,000	6,500	7,000	—	—
4,000	4,500	3,500	4,000	—	—
36,000	45,000	34,000	36,000	—	—
22,000	30,000	20,000	22,000	—	—
13,500	17,000	12,500	13,500	—	—
Cool rapidly from 1850-2050° F.	Cool rapidly from 1950-2050° F.	Cool rapidly from 1850-2050° F.	Cool rapidly from 1800-2000° F.	Cool rapidly from 1800-2000° F.	Cool rapidly from 1800-2000° F.
Same as full	Same as full	Same as full	Same as full	Same as full	Same as full
Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening
Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening
2200° F. Over 1700° F.	2200° F. Over 1700° F.	2200° F. Over 1700° F.	2200° F. Over 1700° F.	2200° F. Over 1700° F.	2150° F. Over 1700° F.
1650° F. 1500° F.	1950° F. 1800° F.	1650° F. 1450° F.	1700° F. 1550° F.	1700° F. 1550° F.	1650° F. 1500° F.
Very good Tough welds	Good Tough welds	Fusion welding not recommended	Very good Tough welds	Very good Tough welds	Very good Tough welds
About 45%	About 45%	About 60%	About 45%	About 45%	About 45%
Good	Good	Fairly good	Very good	Very good	Very good

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STAINLESS STEELS

PROPERTIES OF 300 SERIES (Cont.)

A.I.S.I. TYPE NUMBER	308	309	310
PRINCIPAL ALLOYING ELEMENTS, %	C 0.08 Max. Mn 2.00 Max. Si 1.00 Max. Cr 19.00-21.00 Ni 10.00-12.00	C 0.20 Max. Mn 2.00 Max. Si 1.00 Max. Cr 22.00-24.00 Ni 12.00-15.00	C 0.25 Max. Mn 2.00 Max. Si 1.50 Max. Cr 24.00-26.00 Ni 19.00-22.00
PHYSICAL PROPERTIES			
Density, lb./cu. in.	0.28	0.29	0.29
Mod. of Elasticity in Tension x 10 ⁶ lb./sq. in.	28.0	29.0	29.0
Structure	Austenitic	Austenitic	Austenitic
Specific Heat, B.t.u./° F./lb./32-212° F.	0.12	0.12	0.12
Thermal Conductivity, B.t.u./sq. ft./hr./° F./ft. { 212° F. 932° F.	8.8 12.5	8.0 10.8	8.0 10.8
Mean Coefficient of Thermal Expansion per ° F. x 10 ⁻⁶ { 32-212° F. 32-600° F. 32-1000° F. 32-1200° F.	9.6 9.9 10.2 10.4	8.3 9.3 9.6 10.0	8.0 9.0 9.4 9.7
Melting Range	2550-2590° F.	2550-2650° F.	2550-2650° F.
ELECTRICAL PROPERTIES			
Magnetic Permeability, Annealed Elec. Resistivity, microhm-cm, 70° F.	Non-magnetic $\mu=1.008$ 72.0	Non-magnetic $\mu=1.008$ 78.0	Non-magnetic $\mu=1.008$ 79.0
MECHANICAL PROPERTIES			
Brinell Hardness (Bars) { Annealed Heat Treated Cold Drawn	125-150	140-185	145-210
Rockwell Hardness (Sheet or Strip) { Annealed Heat Treated Cold Rolled	75-90 RB — 10-35 RC	70-85 RB — —	70-85 RB — —
Ultimate Tensile Strength, lbs./sq. in. { Annealed Heat Treated Cold Worked ⁽²⁾	80,000-90,000 — 100,000-180,000	75,000-95,000 — —	75,000-95,000 — —
Yield Strength, lbs./sq. in. { Annealed Heat Treated Cold Worked ⁽²⁾	25,000-40,000 — 50,000-150,000	35,000-55,000 — —	35,000-55,000 — —
Elongation in 2 inches { Annealed Heat Treated Cold Worked ⁽²⁾	60-50% — 50-10%	55-40% — —	55-40% — —
Reduction of Area { Annealed Heat Treated Cold Worked ⁽²⁾	70-55% (Bar) — —	70-50% (Bar) — —	70-50% (Bar) — —
Impact Strength, Izod Value, ft. lbs. { Annealed Heat Treated	115-100 —	120-100 —	115-100 —
Ductility, Annealed—Olsen, inches	—	—	—
Creep Strength, Life of 10,000 hrs. with 1% Elongation, lb./sq. in.	At 1000° F. At 1100° F. At 1200° F. At 1300° F.	— — — —	17,000 13,000 8,500 4,500
Strength at Elevated Temps., Short Time Tests, lb./sq. in.	1300° F. 1500° F. 1700° F.	— — —	45,000 28,000 16,000
HEAT TREATMENT			
Full Anneal	Cool rapidly from 1850-2050° F.	Cool rapidly from 1900-2050° F.	Cool rapidly from 1900-2100° F.
Process Anneal	Same as full	Same as full	Same as full
Hardening—Quench from	Non-hardening	Non-hardening	Non-hardening
Tempering	Non-hardening	Non-hardening	Non-hardening
Initial Forging { Start Finish	2150° F. Over 1700° F.	2150° F. Over 1800° F.	2150° F. Over 1800° F.
HEAT-RESISTANCE			
Scaling Temperature { Continuous Service Intermittent Service	1700° F. 1550° F.	2000° F. 1850° F.	2050° F. 1900° F.
WELDING PROPERTIES			
MACHINING PROPERTIES, Compared to Bessemer Screw Stock No. B1112	Good Tough welds	Good Tough welds	Good Tough welds
DRAWING OR STAMPING	About 45%	About 45%	About 45%
	Good	Good	Good

⁽²⁾Values apply to cold rolled sheet and strip in the 300 Series except Type 303 where values apply to annealed and cold drawn 1 inch diameter bar.

STAINLESS STEELS

PROPERTIES OF 300 SERIES (Cont.)

316 (317) ⁽¹⁾	316L	321	330	347
C 0.08 Max.	C 0.03 Max.	C 0.08 Max.	C 0.20 Max.	C 0.08 Max.
Mn 2.00 Max.	Mn 2.00 Max.	Mn 2.00 Max.	Mn 2.00 Max.	Mn 2.00 Max.
Si 1.00 Max.	Si 1.00 Max.	Si 1.00 Max.	Si 1.50 Max.	Si 1.00 Max.
Cr 16.00-18.00	Cr 16.00-18.00	Cr 17.00-19.00	Cr 17.00-20.00	Cr 17.00-19.00
Ni 10.00-14.00	Ni 10.00-14.00	Ni 9.00-12.00	Ni 34.00-37.00	Ni 9.00-13.00
Mo 2.00- 3.00	Mo 2.00- 3.00	Ti 5 x C. Min.		Cb-Ta 10 x C. Min.
0.29	0.29	0.29	0.29	0.29
28.0	28.0	28.0	29.0	28.0
Austenitic	Austenitic	Austenitic	Austenitic	Austenitic
0.12	0.12	0.12	0.11	0.12
9.4	9.4	9.3	7.8	9.3
12.4	12.4	12.8	9.4	12.8
8.9	8.9	9.3	8.0	9.3
9.0	9.0	9.5	8.9	9.5
9.7	9.7	10.3	9.3	10.3
10.3	10.3	10.7	9.6	10.6
2500-2550° F.	2500-2550° F.	2550-2600° F.	2550-2600° F.	2550-2600° F.
Non-magnetic $\mu=1.008$ 74.0	Non-magnetic $\mu=1.008$ 74.0	Non-magnetic $\mu=1.008$ 71.0	Non-magnetic $\mu=1.008$ 100.0	Non-magnetic $\mu=1.008$ 72.0
135-185	130-150	135-185	140-185	135-185
—	—	—	—	—
180-300	—	180-300	—	—
70-85 RB	70-85 RB	70-90 RB	75-85 RB	70-90 RB
—	—	—	—	—
10-30 Rc	—	10-35 Rc	—	10-35 Rc
75,000-90,000	70,000-85,000	75,000-95,000	70,000-90,000	75,000-100,000
—	—	—	—	—
100,000-150,000	—	100,000-150,000	—	100,000-150,000
30,000-60,000	25,000-55,000	30,000-55,000	35,000-50,000	30,000-55,000
—	—	50,000-125,000	—	50,000-125,000
50,000-125,000	—	50,000-125,000	—	50,000-125,000
60-45%	65-45%	60-45%	60-40%	60-40%
—	—	—	—	—
50-10%	—	50-10%	—	50-10%
75-60% (Bar)	75-65% (Bar)	65-55% (Bar)	70-50% (Bar)	65-55% (Bar)
—	—	—	—	—
120-95	120-95	120-95	110-90	120-95
—	—	—	—	—
0.400-0.500	0.400-0.500	0.400-0.500	—	0.400-0.500
22,400	—	18,000	—	18,300
16,800	—	13,000	—	14,000
11,200	—	8,000	—	9,500
6,900	—	4,500	—	5,200
48,000	—	38,000	60,000	40,000
28,000	—	22,500	37,200	23,500
18,000	—	17,000	20,700	17,500
Cool rapidly from 1800-2000° F.	Cool rapidly from 1800-2000° F.	Cool rapidly from 1750-1850° F.	Cool rapidly from 2050-2250° F.	Cool rapidly from 1850-1950° F.
Same as full	Same as full	Same as full	Same as full	Same as full
Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening
Non-hardening	Non-hardening	Non-hardening	Non-hardening	Non-hardening
2200° F. Over 1700° F.	2200° F. Over 1700° F.	2150° F. Over 1700° F.	2250° F. Over 1800° F.	2200° F. Over 1800° F.
1700° F. 1550° F.	1700° F. 1550° F.	1650° F. 1500° F.	2000° F. 1900° F.	1700° F. 1550° F.
Very good Tough welds	Very good Tough welds	Very good Tough welds	Good Tough welds	Good Tough welds
About 45%	About 45%	About 36%	About 40%	About 36%
Good	Good	Good	Good	Good

⁽¹⁾Properties of Type 317 (19-9-SMo) are similar to Type 316 except chemistry.

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STAINLESS STEELS PROPERTIES OF 400 SERIES

A.I.S.I. TYPE NUMBER	410 (403) ⁽¹⁾	416
PRINCIPAL ALLOYING ELEMENTS, %	C 0.15 Max. Mn 1.00 Max. Si 1.00 Max. Cr 11.50-13.50 I	C 0.15 Max. Mn 1.25 Max. Si 1.00 Max. Cr 12.00-14.00 P 0.06 Max. S 0.15 Min. Mo or Zr 0.60 Max.
PHYSICAL PROPERTIES		
Density, lb./cu. in.	0.28	0.28
Mod. of Elasticity in Tension x 10 ⁶ lb./sq. in.	29.0	29.0
Structure	Martensitic	Martensitic
Specific Heat, B.t.u. /° F./lb./32-212° F.	0.11	0.11
Thermal Conductivity } { 212° F. B.t.u./sq. ft./hr./° F./ft. } { 932° F.	14.4 16.6	14.4 16.6
Mean Coefficient of Thermal Expansion per ° F. x 10 ⁻⁶	{ 32-212° F. 32-600° F. 32-1000° F. 32-1200° F.	5.5 5.6 6.4 6.5
Melting Range	2700-2790° F.	2700-2790° F.
ELECTRICAL PROPERTIES		
Magnetic Permeability, Annealed	Magnetic	Magnetic
Elec. Resistivity, microhm-cm. 70° F.	$\mu=700-1000$ 57.0	$\mu=700-1000$ 57.0
MECHANICAL PROPERTIES		
Brinell Hardness } { Annealed Heat Treated (Bar) } { Cold Drawn	135-215 200-425 170-235	135-215 200-425 170-235
Rockwell Hardness } { Annealed Heat Treated (Sheet or Strip) } { Cold Rolled	75-85RB 95RB-45RC —	— — —
Ultimate Tensile Strength, } { Annealed lb./sq. in. } { Heat Treated Cold Worked ⁽²⁾	65,000-105,000 95,000-200,000 75,000-115,000	65,000-105,000 95,000-200,000 75,000-115,000
Yield Strength, } { Annealed lb./sq. in. } { Heat Treated Cold Worked ⁽²⁾	35,000- 85,000 70,000-150,000 60,000-100,000	35,000- 85,000 70,000-150,000 60,000-100,000
Elongation } { Annealed in 2 inches } { Heat Treated Cold Worked ⁽²⁾	35-20% 30-10% 25-15%	30-20% 25-10% 20-10%
Reduction of Area } { Annealed Heat Treated Cold Worked ⁽²⁾	80-65% 75-55% 75-60%	75-60% 60-40% 65-50%
Impact Strength, Izod Value, ft. lb. } { Annealed Izod Value, ft. lb. } { Heat Treated	110-65 110-20	95-60 60-20
Ductility, Annealed, Olsen, Inches	.275-.350	—
Creep Strength, Life of 10,000 hrs. with 1% Elongation, lb./sq. in.	{ At 1000° F. At 1100° F. At 1200° F. At 1300° F.	12,000 4,600 2,100 1,500
Strength at Elevated Temps., Short Time Tests, lb./sq. in.	{ 1300° F. 1500° F. 1700° F.	15,000 9,000 8,500
HEAT TREATMENT		
Full Anneal	Slow Cool from 1550-1650° F. to 1100° F.	Slow Cool from 1550-1650° F. to 1100° F.
Process Anneal	Air Cool from 1200-1400° F.	Air Cool from 1200-1300° F.
Hardening—Quench from	1700-1850° F.	1700-1850° F.
Tempering ⁽³⁾	400-1300° F.	400-1300° F.
Initial Forging } Start Finish	2200° F. Over 1400° F.	2200° F. Over 1500° F.
HEAT-RESISTANCE		
Scaling Temperature } Continuous Service Intermittent Service	1300° F. 1450° F.	1250° F. 1400° F.
WELDING PROPERTIES	Fair. Preheat 400-500° F. Anneal 1250° F. after welding	Poor. Preheat 400-500° F. Anneal 1250° F. after welding
MACHINING PROPERTIES, Compared to Bessemer Screw Stock No. B1112	About 54%	About 91%
DRAWING OR STAMPING	Fairly good	Fair

⁽¹⁾Properties of Type 403 are similar to Type 410 except chemistry.⁽²⁾Values apply to annealed and cold drawn 1 inch diameter bar stock in the 400 Series except Type 430 where cold rolled sheet and strip values apply.⁽³⁾Tempering temperatures of 800 to 1100° F. should be avoided where impact properties are important.

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**STAINLESS STEELS
PROPERTIES OF 400 SERIES (Cont.)**

430	430-F	431	440-C
C 0.12 Max.	C 0.12 Max.	Mn 0.20 Max.	C 0.95-1.20
Mn 1.00 Max.	Mn 1.25 Max.	Mn 1.00 Max.	Mn 1.00 Max.
Si 1.00 Max.	Si 1.00 Max.	Si 1.00 Max.	Si 1.00 Max.
Cr 14.00-18.00	Cr 14.00-18.00	Cr 15.00-17.00	Cr 16.00-18.00
P 0.06 Max.		Ni 1.25- 2.50	Mo 0.75 Max.
S 0.15 Min.			
Mo or Zr 0.60 Max.			
0.28	0.28	0.28	0.28
29.0	29.0	29.0	29.0
Ferritic	Ferritic	Martensitic	Martensitic
0.11	0.11	0.11	0.11
15.1	15.1	11.7	14.0
15.2	15.2	—	—
5.8	5.8	6.5	5.6
6.1	6.1	6.7	—
6.3	6.3	—	—
6.6	6.6	—	—
2600-2750° F.	2600-2750° F.	—	2500-2700° F.
Magnetic $\mu = 600-1100$ 60.0	Magnetic $\mu = 600-1100$ 60.0	Magnetic — 72.0	Magnetic — 60.0
140-185	140-185	240-270	210-250
—	—	270-440	275-600
185-230	190-230	270-325	—
75-90RB	—	30-35Rc	—
—	—	25-45Rc	—
90-105RB	—	—	—
65,000-85,000	70,000-90,000	120,000-130,000 140,000-220,000 130,000-150,000	110,000-125,000 130,000-265,000
—	—	—	—
90,000-130,000	85,000-115,000	—	—
40,000-65,000	40,000-55,000	95,000-115,000 100,000-180,000 110,000-140,000	65,000-80,000 90,000-250,000
—	—	—	—
65,000-125,000	70,000-100,000	—	—
30-20%	30-20%	25-15% 20-10% 15-10%	15-10% 12-2%
—	—	—	—
20-2%	18-10%	—	—
70-60%	60-55%	60-55% 55-30% 50-35%	30-25% 20-2%
—	—	—	—
60-45%	55-40%	—	—
50-5	50-5	80-50 70-25	15-5 10-3
—	—	—	—
.300-.400	—	—	—
8,400	8,400	—	—
4,900	4,900	—	—
2,200	2,200	—	—
1,400	1,400	—	—
15,000	15,000	26,000	30,500
8,000	8,000	10,500	17,000
5,000	5,000	8,000	16,500
Air Cool from 1350-1500° F.	Air Cool from 1350-1500° F.	Not Practical	Slow Cool from 1550-1650° F. to 1100° F.
Air Cool from 1350-1500° F.	Air Cool from 1350-1500° F.	Air Cool from 1150-1200° F.	Air Cool from 1250-1350° F.
Non-hardening	Non-hardening	1700-1950° F.	1850-1950° F.
Non-hardening	Non-hardening	400-1200° F.	300-800° F.
1950° F. Over 1200° F.	2050° F. Over 1400° F.	2100° F. Over 1500° F.	2100° F. Over 1700° F.
1550° F. 1650° F.	1500° F. 1600° F.	1500° F. 1600° F.	1400° F. 1500° F.
Fair, Non-ductile welds. Some response to annealing	Poor, Non-ductile welds. Some response to annealing	Fair, Preheat 400-500° F. Anneal 1200° F. after welding	Not recommended
About 54%	About 91%	About 40%	About 40%
Fairly good	Fairly good	Non recommended	Non recommended

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CORROSION RESISTANCE OF STAINLESS STEELS

The data presented in the following table give the corrosion-resistance of Types 430, 302, and 316 to various chemical media. The result should be regarded only as indicative of the service life and not as a guarantee of performance.

Due to variations encountered in service which cannot be duplicated in the laboratory, such as the impurities under commercial conditions which may exert an effect that would not be present when dealing with chemically pure materials in a laboratory test, it is highly advisable whenever possible to subject samples to actual operating conditions before drawing definite conclusions. Also the condition of the material as furnished by the mill may be somewhat altered during fabrication. Furthermore, it should not be concluded that in instances where stainless steel is not affected by several substances used alone, that their combinations will have no reaction on the steel.

The symbols in this table represent the approximate corrosion-resistance as follows:

- I Fully Resistant
- II Satisfactorily Resistant
- III Fairly Resistant
- IV Slightly Resistant
- V Not Resistant

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Acetic Acid					
5% Agitated		70°			
5% Aerated		70°			
5%		100°			
5%		180°			
10% Agitated		70°			IV
10% Aerated		70°			
10%		100°			
10%		180°			
10%		Boiling			
10%		60°			
15%		100°			IV
15%		180°			IV
15%		Boiling			
20% Agitated		70°			
20% Aerated		70°			
20% Aerated		180°			
33%		70°			III
33%		100°			IV
33%		180°			
33%		Boiling			
40% Aerated		180°			
50%		70°			III
50%		Boiling			V
60%		60°			III
60%		100°			IV
60%		180°			
60%		Boiling			
80%		70°			III
80%		100°			IV
80%		180°			
80%		Boiling			
90% Aerated		180°			
100%		70°			
100%		100°			
100%		180°			
100%		Boiling			
100%—150-lb. Press.		400°		V	
Acetic Anhydride					
90% Anhydride		70°			
90% Anhydride		180°			
90% Anhydride		Boiling			
Aerated					
90% Anhydride		180°		IV	
60% Anhydride		180°		II	
30% Anhydride		180°		IV	
Acetic Acid Vapors					
30%		Hot		III	
100%		Hot		V	

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Acetone		70°	I	I	II
	Boiling		I	I	..
Acetyl Chloride	Cold	II	II	II	..
	Boiling	II	II	II	..
Acetylene		70°	I	I	I
Acid Salt Mix					
10% H ₂ SO ₄ Sp. G. 1.07					
+10% CuSO ₄ • 5 H ₂ O	Boiling		I	I	..
10% H ₂ SO ₄ Sp. G. 1.07			I	I	..
+2% FeSO ₄ • 7 H ₂ O	Boiling		I	I	..
Alcohol, Ethyl		70°	I	I	I
	Boiling		I	I	I
Alcohol, Methyl		70°	I	I	I
	150°	II	*III	III	III
Aluminum, Molten		1400°	V	V	V
Aluminum Acetate					
Saturated		70°	I	I	..
Saturated	Boiling		I	I	..
Aluminum Chloride					
10% Quiescent		70°	III	IV	IV
25% Quiescent		70°	III	IV	IV
Aluminum Fluoride		70°	III	IV	IV
Aluminum Hydroxide					
Saturated		70°	I	*I	*I
Aluminum Sulphate					
5%		150°	I	*I	*I
10%		70°	I	*I	*II
10%	Boiling		I	*II	*III
Saturated		70°	I	*II	*IV
Saturated	Boiling		I	*II	*V
Aluminum Chromium					
Sulphate 5%		70°	I	*I	..
Sp. G. 1.6	Boiling		..	*V	..
Aluminum Potassium					
Sulphate (Alum)					
2%		70°	I	*I	*I
10%		70°	I	*I	*II
10%	Boiling		I	*II	*III
Saturated		Boiling	II	*III	*IV
Ammonia (Dry or Moist)					
All concentrations		70-212°	I	I	I
Ammonia (Anhydrous)		800° up	V	V	V
Ammonium Hydroxide		70°	I	I	I
	Boiling		I	I	I
Ammonium					
Bicarbonate		70°	I	I	..
	Hot		I	I	..
Ammonium Bromide					
5%		70°	I	I	..
Ammonium Carbonate					
1% Quiescent		70°	I	I	I
5% Quiescent		70°	I	I	I
1% Aerated		70°	I	I	I
5% Aerated		70°	I	I	I
1% Agitated		70°	I	I	I
5% Agitated		70°	I	I	I
Ammonium Chloride					
1% Quiescent		70°	I	*I	*I
1% Aerated		70°	I	*I	*I
1% Agitated		70°	I	*I	*I
10%		Boiling	*I	*I	*I
20%		Boiling	*I	*I	..
28%		Boiling	*I	*II	..
50%		Boiling	*I	*II	..
Ammonium					
Chlorostannate					
Saturated		70°	I	II	..
Saturated		140°	III	V	..

*Subject to pitting at air line or when allowed to dry.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Ammonium Nitrate					
All Conc. Agitated}		70°	|	|	|
Aerated}					
Saturated		Boiling	|	|	|
Ammonium Oxalate					
5%		70°	|	|	..
Ammonium Perchlorate					
10%		Boiling	|	|	..
Ammonium Persulphate					
5%		70°	|	|	|
Ammonium Phosphate					
5%		70°	|	|	|
Ammonium Potassium Sulphate (Alum)	Dilute and saturated	Various	|	*|	*||
Ammonium Sulphate					
1% Aerated		70°	|	|	|
1% Agitated		70°	|	|	|
5% Aerated		70°	|	|	|
5% Agitated		70°	|	|	|
10%		Boiling	*|	*||	..
Saturated		Boiling	|	||	..
Ammonium Sulphite		70° Boiling	|	|	..
Aniline					
3%		70°	|	|	|
Concentrated Crude		70°	|	|	|
Aniline Hydrochloride		70°	IV	V	V
Antimony					
Molten		1100°	V	V	V
Antimony Sulphide					
Molten		1200-1600°	V	V	V
Antimony Trichloride		70°	IV	V	V
Arsenic Acid		150°	|	|	..
Barium Carbonate		70°	|	|	|
Barium Chloride					
5%		70°	|	|	*|
Saturated		70°	|	|	*|
Aqueous Solution		Hot	*|	*||	..
Barium Hydroxide					
All concentrations		Cold and Hot	|	|	|
Barium Nitrate					
Aqueous Solution		Hot	|	|	..
Barium Sulphate (Barytes-Blanc Fixe)		70°	|	|	|
Beer					
(Barley, Malt & Hops)		70°	|	|	..
3.5%-4.5% Alcohol		160°	|	|	..
Benzene (Benzol)		70° Hot	|	|	|
Benzoic Acid		70°	|	|	|
Blood (Meat Juices)		Cold	|	*|	|
Borax 5%		Hot	|	|	|
Boracic Acid 5%		Hot and Cold	|	|	|
Boric Acid, Saturated		Boiling	|	|	|
Bromine—Bromine Water		70°	IV	V	V
Buttermilk		70°	|	|	|
Butyric Acid					
5%		70°	|	|	|
5%		150°	|	|	|
Aqueous Solution					
Sp. G. .964		Boiling	|	|	|

*Subject to pitting at air line or when allowed to dry.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Calcium Carbonate		70°	I	I	I
Calcium Chlorate	Dilute	Cold and Hot	I	I	..
Calcium Chloride	Dilute	70°	*I	*II	*III
	Conc. Solutions	70°	*I	*II	*III
Calcium Chlorohypochlorite (Bleaching Powder)	1%	70°	***II	***III	..
	5%	70°	***III	***III	..
Calcium Hypochlorite	2%	70°	***I	***II	***III
Aqueous Solution	Sp. G. 1.04	100°	***I	***III	***III
Calcium Chlorate	Dilute Solution	70°	I	I	..
	Dilute Solution	Hot	I	I	..
Calcium Hydroxide	10%	Boiling	I	I	..
	20%	Boiling	I	I	..
	50%	Boiling	II	III	..
Calcium Sulphate	Saturated	70°	I	I	I
Cadmium		Molten	III	III	..
Camphor		70°	I	I	I
Cane Juice (Sugar Cane)		Hot	I	I	..
Carbolic Acid (Phenol)					
C.P. plus 10% water		Boiling	I	I	I
C.P.		70°	I	I	I
C.P.		(Boil) 360°	I	I	I
Crude		212°	I	I	..
Crude		Boiling	I	I	..
Carbon Bisulphide		70°	I	I	I
Carbon Monoxide Gas		1400°	I	I	I
		1600°	I	I	I
Carbon Tetrachloride					
C.P.		70°	I	I	I
C.P.		Boiling	I	I	..
Commercial plus					
1% water		Boiling	*II	..	..
Commercial plus					
1% HCl		Boiling	*II	..	..
Carbonated Beverages					
Various concentrations		Cold	I	I	..
Carbonated Water (Carbonic Acid)		Cold and Hot	I	I	I
Carbonic Acid	All concentrations	Cold and Hot	I	I	I
Carnallite					
Saturated Solution		Boiling (KCl + MgCl ₂ + 6H ₂ O)	II	II	..
Caustic Soda (See Sodium Hydroxide)					
Chinosol Antiseptic					
Aqueous Solution	1-500 dilution	70°	I	I	..
Cellulose			I	I	I
Chloracetic Acid		70°	III	IV	V
Chlorine Gas					
Dry		70°	I	I	III
Moist		70°	III	IV	V
		212°	IV	V	V

*Subject to pitting at air line or when allowed to dry.

**Not recommended for standing baths.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance Condition	Temp. F.	Type 316	Type 302	Type 430
Chlorinated Water Saturated.....	70°	****II	***III	IV
Chloric Acid.....	70°	IV	V	V
Chlorobenzene (Phenyl Chloride) C.P.....	70° Boiling	I	I	..
Chloroform.....	70°	I	I	I
Chlorosulphonic Acid Dilute.....	70°	V	V	V
Chromic Acid 5% C.P.....	70°	I	I	II
10% C.P.....	70°	II	II	IV
10% C.P.....	Boiling	II	III	..
50% C.P.....	70°	II	II	..
50% C.P.....	Boiling	..	III	..
Commercial 50% (Cont. SO ₃).....	70°	I	I	..
Commercial 50% (Cont. SO ₃).....	Boiling	III	*IV	IV
Chromium Plating Bath.....	70°	I	I	..
Cider.....	70°	I	I	I
Citric Acid 5% Quiescent.....	70°	I	I	..
5% Quiescent.....	150°	I	I	..
10%.....	70°	I	II	..
10%.....	Boiling	II	II	..
15%.....	70°	I	II	..
15%.....	Boiling	II	II	II
25%.....	70°	I	IV	..
25%.....	Boiling	II	IV	..
50%.....	70°	I	IV	..
50%.....	Boiling	II	IV	..
Conc.....	Boiling	II	III	..
5%—45-lb. sq. in. Press.....	284°	II	IV	..
Coca-Cola Syrup (Pure).....	70°	I	I	I
Coffee.....	Boiling	I	I	I
Copperas. (See Ferrous Sulphate).....				
Copper Acetate Saturated Solution.....	70°	I	I	I
Copper Carbonate Sat. Sol. in 50% NH ₄ OH.....	Cold and Hot	I	I	I
Copper Chloride (Cupric Chloride) 1% Agitated.....	70°	*I	*II	*II
1% Aerated.....	70°	*I	*II	*II
5% Agitated.....	70°	*II	*III	*II
5% Aerated.....	70°	*III	*V	*V
Copper Cyanide (Cupric Cyanide) Saturated Solution.....	Boiling	I	I	I
Copper Nitrate (Cupric Nitrate) 1% Quiescent.....	70°	I	I	..
1% Agitated.....	70°	I	I	..
1% Aerated.....	70°	I	I	..
5% Quiescent.....	70°	I	I	..
5% Agitated.....	70°	I	I	..
5% Aerated.....	70°	I	I	..
50% Aqueous Sol.....	Boiling	I	I	..
Copper Sulphate (Cupric Sulphate) 5% Agitated.....	70°	I	I	..
5% Aerated.....	70°	I	I	..
Saturated Solution.....	Boiling	I	I	..
Cream of Tartar.....	Cold and Hot	I	I	..

*Subject to pitting at air line or when allowed to dry.

**Not recommended for standing baths.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Creosote (Coal Tar)		Hot	—	—	..
Creosote Oil		Hot	—	—	..
Cyanogen Gas		70°	—	—	..
Dichloroethane		Boiling	—	—	..
Dinitrochlorobenzene Melted and Solidified		70°	—	—	—
Distillery Wort		70°	—	—	—
Dyewood Liquor		70°	—	†	..
Epsom Salt (Magnesium Sulphate)		Hot and Cold	—	—	—
Ether		70°	—	—	—
Ethyl Chloride		70°	—	—	—
Ethylene Chloride		70°	—	—	..
Ferric Chloride 1% to Saturation		70°	V	V	V
Ferric Hydroxide (Hydrated Iron Oxide)		70°	—	*†	..
Ferric Nitrate					
1% Quiescent		70°	—	—	—
5% Quiescent		70°	—	—	—
1% Agitated		70°	—	—	—
5% Agitated		70°	—	—	—
1% Aerated		70°	—	—	—
5% Aerated		70°	—	—	—
Ferric Sulphate					
1% Quiescent		70°	—	—	—
1% Aerated		70°	—	—	—
1% Agitated		70°	—	—	—
5% Quiescent		70°	—	—	—
5% Aerated		70°	—	—	—
5% Agitated		70°	—	—	—
10%		Boiling	—	—	—
Ferrous Sulphate					
10%		70°	—	*†	*†
10%		Boiling	—	*†	..
Fluorine (Gas)		70°	V	V	V
Formalin (40% Formaldehyde)		70°	—	—	—
Formic Acid					
5%		70°	—	II	II
5%		150°	—	II	II
10%		70°	—	II	II
10%		Boiling	—	—	V
50%		70°	—	II	II
50%		Boiling	—	—	V
90%		Boiling	—	—	..
100%		70°	—	—	..
100%		Boiling	II	II	..
Fruit Juices		70°	—	—	—
Fuel Oil		Hot	—	—	..
Cont. Sulphuric Acid			II	III	..
Furfural		70°	—	—	..
Gallic Acid					
5%		70°	—	—	—
5%		150°	—	—	—
Sat. at 212° F.		Boiling	—	—	..
Gasoline		70°	—	—	—
Gelatin		Cold to 140°	—	—	—
Glauber's Salt (See Sodium Sulphate)					
Glue, Dry		70°	—	—	—
Acid Solution		70°	—	*||	..
Acid Solution		140°	—	*||	..
Glycerine		70°	—	—	—

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Gypsum (See Calcium Sulphate).....					
Hydrochloric Acid	All concentrations.....	70°	V	V	V
Hydrobromic Acid	All concentrations.....	Cold and Hot	V	V	V
Hydrocyanic Acid.....	70°	I	I	III	
Hydrofluosilicic Acid.....	70°	IV	V	..	
Hydrofluoric Acid	All concentrations.....	Cold and Hot	V	V	V
Hydrogen Peroxide.....	70°	I	II	II	III
	Boiling	I	II	II	III
Hydrogen Sulphide	Dry.....	70°	I	I	I
	Wet.....	70°	II	III	III
Ink.....	70°	I	II	..	
Iodine.....	70°	IV	V	V	
Iodoform.....	70°	I	I	..	
Kerosene.....	70°	I	I	I	
Ketchup	Quiescent.....	70°	I	*	*
	Quiescent.....	150°	I	*	*
Lactic Acid	1%.....	70°	I	I	I
	1%.....	Boiling	I	I	II
	5%.....	70°	I	I	II
	5%.....	150°	I	I	II
	5%.....	Boiling	I	I	II
	10%.....	70°	I	I	II
	10%.....	150°	I	I	II
	10%.....	Boiling	I	I	II
	Conc.....	70°	I	I	..
	Conc.....	Boiling	II	III	..
Lard.....	70°	I	I	I	
Lead, Molten.....	750°	II	II	II	
Lead Acetate 5%.....	Boiling	I	I	..	
Linseed Oil.....	70°	I	I	I	
Plus 3% H ₂ SO ₄	390°	I	I	..	
Lysol.....	70°	I	I	IV	
Magnesium Carbonate	All concentrations.....	Cold and Hot	I	I	I
Magnesium Chloride	1% Quiescent.....	70°	I	*	*
	1% Quiescent.....	Hot	II	III	*
	5% Quiescent.....	70°	I	*	*
	5% Quiescent.....	Hot	II	III	..
Magnesium Hydroxide	Thick suspension.....	70°	I	I	..
Magnesium Nitrate	All concentrations.....	Cold and Hot	I	I	I
Magnesium Oxychloride.....	70°	II	III	..	
Magnesium Sulphate (See Epsom Salt).....					
Malic Acid.....	Cold and Hot	I	I	I	
Manganese Carbonate	All concentrations.....	Cold and Hot	I	I	I
Mash.....	Hot	I	I	..	
Mayonnaise.....	70°	I	*	..	
Mercury.....	70°	I	I	I	
Mercuric Chloride	Dilute Solution.....	70°	IV	V	V

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Mercurous Nitrate					
All concentrations		Cold and Hot	|	|	|
Methanol (See Alcohol, Methyl)					
Methylene Chloride					
40%		Cold and Hot	|	|	..
Milk, Fresh or Sour		70° Boiling	|	|	..
Mine Water—Acid		60°	*|	*|	..
Molasses		Cold and Hot	|	|	|
Molybdic Acid					
5%		70°	|	|	..
Mustard		70°	|	*|	*|
Muriatic Acid		70°	V	V	V
Naphtha, Pure		70°	|	|	|
Crude		70°	|	|	..
Naphthalenesulfonic Acid		70°	|	|	..
Nickel Chloride, Solution		70°	*|	*|	..
Nickel Nitrate					
All concentrations		Cold and Hot	|	|	|
Nickel Sulphate		Cold and Hot	|	|	..
Niter Cake		Fused	|	II	II
Nitrating Solutions		Cold and Hot	II	II	II
Nitric Acid					
5%		70°	|	|	|
5%		Boiling	|	|	III
20%		70°	|	|	II
20%		Boiling	|	|	II
40%		70°	|	|	II
40%		Boiling	|	|	II
50%		70°	|	|	II
50%		Boiling	|	|	II
65%		70°	|	|	II
65%		Boiling	|	|	II
Conc.		70°	|	|	II
Conc.		Boiling	|	|	II
Fuming Conc.		70°	|	|	II
Fuming Conc.		110°	|	|	II
Fuming Conc.		Boiling	IV	IV	IV
Nitrous Acid 5%		70°	|	|	|
Oils, Crude		Cold and Hot	†|	†|	†|
Oils, Vegetable, Mineral		Cold and Hot	|	†|	†|
Oleic Acid		70° 300° 400°	|	*| *| *|	*II *II ..
Oxalic Acid					
5%		70°	|	|	|
5%		Boiling	|	|	|
10%		70°	|	|	II
10%		Boiling	|	|	V
25%		Boiling	|	|	..
50%		Boiling	|	|	..
Paraffin		Cold and Hot	|	|	|
Paregoric Compound		70°	|	|	..
Phenol (See Carbolic Acid)					
Phenolic Resins		Cold and Hot	|	|	..
Petroleum Ether		70°	|	|	|

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Phosphoric Acid					
1%		70°	††	††	††
1%	Boiling				
1%—45-lb. Press.	284°				
5% Quiescent	70°				
5% Agitated	70°				
5% Aerated	70°				
10% Quiescent	70°				
10% Agitated	70°				
10% Aerated	70°				
10%	Boiling				
25%	Boiling		||		||
45%	Boiling		||	||	||
50%	Boiling		||	||	||
80%	70°		||	||	||
80%	230°		|||	V	V
85%	Boiling		|||	V	V
Phosphoric Anhydride					
Dry	Cold and Hot		|	|	
Photographic Solutions					
Film and Paper Developers	70°		|	|	III
Hypo (Acid Fixing Baths)	70°		††	††	IV
Other Solutions (Toners, Reducers, Tray Cleaners, etc.)				Details on request.	
Picric Acid		70°	|	|	|
Pine Tar Oil		Cold and Hot	|	|	
Potash (See Potassium Hydroxide)					
Potassium Bichromate					
25%	70°		|	|	|
25%	Boiling		|	|	
Potassium Bromide		70°	*|	*||	
Potassium Carbonate					
1% Quiescent	70°		|	|	|
Agitated	70°		|	|	|
Aerated	70°		|	|	|
50%	Boiling		|	|	
Potassium Chlorate					
Saturated at 212°	Boiling		|	|	|
Potassium Chloride					
1% Quiescent	70°		|	|	*
1% Agitated	70°		|	|	*
1% Aerated	70°		|	|	*
5% Quiescent	70°		|	|	*
5% Agitated	70°		|	|	*
5% Aerated	70°		|	|	*
5%	Boiling		|	|	
Potassium Dichromate					
All concentrations (neutral)	Cold and Hot		|	|	|
Potassium Ferricyanide					
5%	70°		|	|	|
25%	70°		|	|	
25%	Boiling		|	|	
Potassium Ferrocyanide					
5%	70°		|	|	|
Potassium Hydroxide					
5% Quiescent	70°		|	|	|
5% Agitated	70°		|	|	|
5% Aerated	70°		|	|	|
27%	Boiling		|	|	
50%	Boiling		||		
Potassium Hypochlorite					
Conc.	70°		||	||	
Potassium Iodide					
All concentrations	Cold and Hot		|	|	

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

††May attack when hydrochloric acid is present.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Potassium Nitrate					
	Quiescent				
	1% Agitated	70°	||	||	||
	Aerated				
	Quiescent				
	5% Agitated	70°	||	||	||
	Aerated				
50%		70°	||	||	..
50%		Boiling	||	||	..
Molten		1022°	||	||	..
Potassium Oxalate		70°	||	||	||
Potassium Permanganate					
5%		70°	||	||	||
10%		Boiling	||	||	..
Potassium Sulphate					
1% Quiescent		70°	||	||	||
1% Agitated		70°	||	||	||
1% Aerated		70°	||	||	||
5% Quiescent		70°	||	||	||
5% Agitated		70°	||	||	||
5% Aerated		70°	||	||	||
5%		Hot	||	||	..
Pyrogallic Acid		Cold and Hot	||	||	||
Quinine Sulphate, Dry		70°	||	||	II
Quinine Bisulphate, Dry		70°	||	II	II
Rosin, Molten		150°	||	||	||
Sauerkraut Brine		70°	||	V	..
Sea Water		70°	||	*I	*III
Sewage		70°	†I	†I	..
Silver Bromide		Cold and Hot	*I	*II	*III
Silver Chloride		Cold and Hot	V	V	V
Silver Nitrate					
10%		70°	||	||	||
10%		Boiling	||	||	..
Soaps		70°	||	||	||
Sodium Acetate, Moist		70°	||	*I	||
Sodium Carbonate					
5%		70°	||	||	||
5%		150°	||	||	||
5%		Boiling	||	||	||
50%		Boiling	||	||	..
Molten		1650°	V	V	..
Sodium Bicarbonate					
All concentrations		70°	||	||	||
5% Quiescent		150°	||	||	||
Sodium Bichromate					
All concentrations (neutral)		Cold and Hot	||	||	||
Sodium Bisulphite					
All concentrations		Cold and Hot	||	*I	..
Sodium Borate					
All concentrations		Cold and Hot	||	||	||
Sodium Chlorate					
25%		Cold and Hot	||	||	..
Sodium Chloride					
5% Quiescent		70°	||	*I	*II
5% Quiescent		150°	||	*I	*II
20% Aerated		70°	||	*I	..
Saturated		70°	||	*I	..
Saturated		Boiling	||	*II	..
Sodium Citrate					
All concentrations		Cold and Hot	||	||	..
Sodium Ferricyanide					
5% (neutral)		Cold and Hot	*I	*I	..

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance	Condition	Temp. F.	Type 316	Type 302	Type 430
Sodium Hypochlorite 5%		70°	***I	***II	***III
Sodium Lactate 10%		Cold and Hot	I	I	..
Sodium Nitrate All Concentrations		Cold and Hot	I	I	I
Sodium Nitrite All concentrations		Cold and Hot	I	I	..
Sodium Fluoride 5%		70°	*I	*II	III
Sodium Hydroxide 20%		70°	I	I	I
30%		Boiling	II	II	III
Molten		600°	II	II	..
Sodium Nitrate		Fused	I	II	III
Sodium Perchlorate 10%		70°	I	I	..
10%		Boiling	I	I	..
Sodium Peroxide 10%		70°	I	I	..
10%		200°	I	I	..
Sodium Phosphate 5%		Cold and Hot	I	I	..
Sodium Salicylate All concentrations		70°	I	I	I
Sodium Silicate		Cold and Hot	I	I	I
Sodium Sulphate 5% Saturated		70°	I	I	..
Sodium Sulphite 5%		70°	I	I	III
10%		150°	I	I	I
25%		Boiling	I	I	..
50%		Boiling	I	I	..
Sodium Hyposulphite 25%		70°	I	†I	II
25%		Boiling	I	I	..
Sodium Sulphide Saturated		70°	I	*II	..
Soy Bean Oil		Cold and Hot	I	I	..
Stannic Chloride, Sp. G. 1.21		70°	III	IV	..
Sp. G. 1.21		Boiling	IV	V	..
Stannous Chloride, Saturated		120°	I	II	..
		Boiling	..	V	..
Starch, Aq. Sol'n.		70°	I	I	..
Stearic Acid		70°	I	I	I
Strontium Hydroxide		70°	I	I	..
Strontium Nitrate, Solution		Hot	I	I	..
Sugar Juice		Hot	I	I	I
Sulphur Chloride		Cold and Hot	V	V	V
Sulphur, Moist		70°	*I	*II	*II
Molten		266°	I	I	I
Molten		833°	III	III	..
Sulphur Monochloride		70°	I	I	..
Sulphur Dioxide Gas Moist		70°	I	II	III
Gas		575°	I	I	I
Sulphuric Acid 5%		70°	II	III	III
5%		Boiling	III	V	V
10%		70°	II	III	III

*Subject to pitting at air line or when allowed to dry.

**Not recommended for standing baths.

†May attack when sulphuric acid is present.

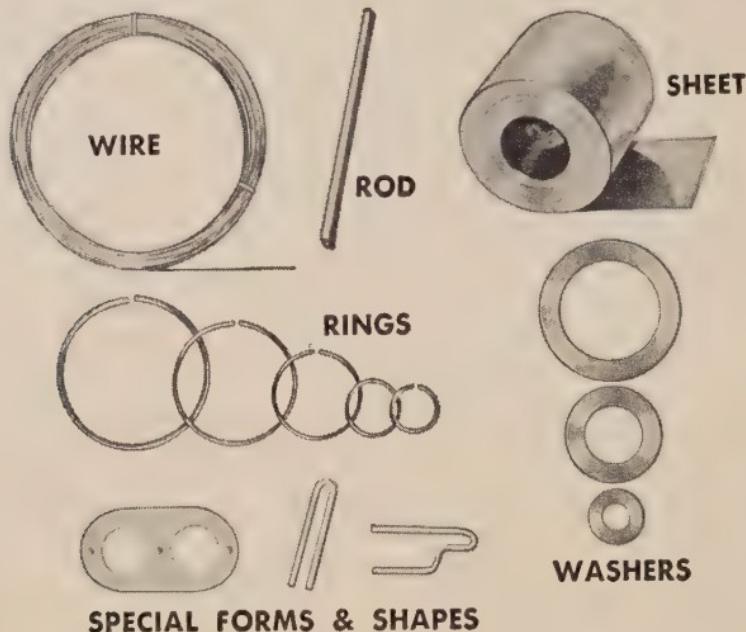
CORROSION RESISTANCE OF STAINLESS STEELS (Cont.)

Substance Condition	Temp. F.	Type 316	Type 302	Type 430
Sulfuric Acid (Cont.)				
10%.....	Boiling	IV	V	V
50%.....	70°	III	IV	..
50%.....	Boiling	IV	V	V
Conc.....	70°	I	I	I
Conc.....	Boiling	IV	IV	IV
Conc.....	300°	V	V	V
Fuming.....	70°	II	III	..
Sulphurous Acid				
Saturated.....	70°	II	III	III
Saturated, 60-lb. Press.....	250°	II	III	III
Saturated, 70-125-lb. Press.....	310°	III	III	III
Saturated, 150-lb. Press.....	375°	III	III	III
Spray.....	70°	*IV	*IV	..
Sweet Water.....	Hot	I	I	*I
Syrup.....	Hot	I	I	..
Tannic Acid.....	70°	I	I	I
	150°	I	II	..
Tanning Liquor.....	70°	I	I	..
Tar.....	Cold and Hot	I	I	..
Tartaric Acid				
10%.....	70°	I	I	I
10%.....	Boiling	I	I	II
50%.....	Boiling	I	I	..
Saturated at 212°.....	Boiling	..	V	..
Tin, Molten.....	450°	III	III	III
Trichloracetic Acid.....	70°	IV	V	V
Tung Oil.....	Cold and Hot	I	I	..
Turpentine Oil.....	95°	I	I	..
Uric Acid.....	70°	I	I	..
Varnish.....	70°	I	I	I
	Hot	..	..	..
Vegetable Juices.....		I	I	..
Vinegar, Quiescent.....	70°	I	I	I
Agitated.....	70°	..	..	..
Aerated.....	70°	..	..	..
	Hot	..	..	..
Vinegar Fumes.....	70°	I	II	II
Whiskey.....	70°	I	I	..
Wine, In all phases of processing and storage.....	75°	I	I	I
Wood Pulp.....	70°	I	I	..
Wood Pulp Liquors				
Digestive Liquors				
(3% $\text{Ca}(\text{HSO}_3)_2 +$ 2% $\text{H}_2\text{SO}_4 + \text{SO}_2$ + Air).....	Boiling	I	V	..
Black Waste Liquors (Alkaline) Fired.....	1800°	V	V	V
Black Waste Liquors.....	Boiling	I	I	I
Wort.....	Cold and Hot	I	I	..
Yeast.....	Cold and Hot	I	I	..
Zinc, Molten.....	800°	V	V	V
Zinc Chloride				
5%.....	70°	I	I	*I
5%.....	Boiling	*I	*II	*II
20%.....	70°	..	..	*I
20%.....	Boiling	..	II	*V
70%.....	70°	..	..	..
70%.....	Boiling	..	IV	..
Zinc Cyanide, Moist.....	70°	I	I	..
Zinc Nitrate, Solution.....	Hot	I	I	..
Zinc Sulphate				
5%.....	70°	I	I	I
25%.....	Boiling	I	I	I
Saturated.....	70°	I	I	I

*Subject to pitting at air line or when allowed to dry.

EASY-FLO SILVER ALLOYS

For Low Temperature Brazing



Low flowing temperatures speed up production and reduce costs. Produce high strength ductile, leak-tight joints. High electrical and thermal joint conductivity. At brazing heat the fluidity makes brazing action fast.

Easy-Flo joins ferrous and non-ferrous metals which melt at temperatures above the flow points of the alloy used, including iron, steel, stainless steel, nickel, copper, brass, bronze and other copper-nickel and chrome-nickel alloys. Effective for joining dissimilar metals. Wide melting range alloys make larger fillets where required. Easy-Flo 3 is used for brazing cemented carbide tips and for fabricating large copper pipe.

Alloy	Silver Content, Per Cent	Melting Range	Starts to Flow at °F	Starts to Flow at °C	Free Flowing at °F	Free Flowing at °C
Easy-Flo.....	50.....	Narrow.....	1160.....	627.....	1175.....	635.....
Easy-Flo 45.....	45.....	Narrow.....	1125.....	607.....	1145.....	618.....
Easy-Flo 35.....	35.....	Wide.....	1125.....	607.....	1295.....	702.....
Easy-Flo 3.....	50.....	Wide.....	1170.....	632.....	1270.....	688.....

Standard Sizes	Approx. Length per † Troy Oz., Inches	
	Easy-Flo, Easy-Flo 3, and Easy-Flo 45	Easy-Flo 35
1/8" Wire (Coils).....	16.....	17.....
3/32" Wire (Coils).....	29.....	30.....
1/16" Wire (Coils).....	66.....	68.....
3/64" Wire (Coils).....	116.....	120.....
1/32" Wire (Coils).....	264.....	272.....
1/64" Wire (Coils).....	1155.....	1194.....

	Square Inches	Square Inches
.020" Strip or Sheet (Coils).....	10.....	10.....
.010" Strip or Sheet (Coils).....	20.....	21.....
.005" Strip or Sheet (Coils).....	40.....	41.....
.003" Strip or Sheet (Coils).....	67.....	69.....

† A troy ounce is about 10% heavier than an avoirdupois ounce—that is, one troy ounce equals 1.997 avoirdupois ounces. One avoirdupois pound equals 14.583 troy ounces.

‡ In widths of 1/4" or more.

Technical bulletins, covering applicable specifications and complete details on Easy-Flo, available upon request.

COLD FINISHED CARBON STEEL BARS**AIRCRAFT QUALITY ALLOY STEEL
BARS, SHEETS & PLATES****TOOL & DIE STEELS****INDEX****COLD FINISHED CARBON STEEL BARS**

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Steel
Bars,
Strip
C.F., Alloy
Tool Steel

**CARBON TOOL STEEL BARS AND SHEETS, DIE STEEL
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C1018 COLD FINISHED STEEL BARS**Spec. QQ-S-633 — Color Code — White**

A low carbon Open Hearth Steel of Shafting Quality. Has good carburizing qualities—readily welded. Tensile strength 70/100,000 Lbs. P.S.I. Recommended heat treatment: carburize.

Die drawing process, in addition to increasing yield point of steel over that of hot rolled bars by approximately 100 per cent, produces a bright, smooth surface which is further improved by straightening rolls; this grade of shafting is adaptable to a variety of applications where requirements of finish, accuracy and straightness are not too exacting.

This type of bar, where desirable, can be produced from steel which can be readily machined as an aid in obtaining a smooth finish where it is necessary to reduce the original size of the bar.

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.
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ROUND — COLD DRAWN**Stock Lengths 12 Feet Random**

1/8042.....	.50	3/16094.....	1.13
5/32065.....	.78	7/32128.....	1.54

Stock Lengths 20 Feet Random

1/4 .....	.1669.....	3.34	11/16	8.773.....	175.46
5/32 .....	.2112.....	4.22	1 1/8	9.388.....	187.76
5/16 .....	.2608.....	5.22	1 1/16	10.02.....	200.40
11/32 .....	.3155.....	6.32	2	10.68.....	213.60
3/8 .....	.3755.....	7.51	2 1/16	11.36.....	227.20
7/16 .....	.5111.....	10.22	2 1/8	12.06.....	241.20
1/2 .....	.6676.....	13.35	2 5/16	12.78.....	255.60
9/16 .....	.8449.....	16.90	2 1/4	13.52.....	270.40
5/8	1.043.....	20.86	2 1/2	14.28.....	285.60
11/16	1.262.....	25.24	2 3/8	15.06.....	301.20
3/4	1.502.....	30.04	2 5/8	15.87.....	317.40
13/16	1.763.....	35.26	2 1/2	16.69.....	333.80
7/8	2.045.....	40.90	2 1/4	17.54.....	350.80
15/16	2.347.....	46.94	2 1/2	18.40.....	368.00
1	2.670.....	53.40	2 1/16	19.29.....	385.80
1 1/16	3.015.....	60.30	2 3/4	20.19.....	403.80
1 1/8	3.380.....	67.60	2 13/16	21.12.....	422.40
1 3/16	3.766.....	75.32	2 7/8	22.07.....	441.40
1 1/4	4.172.....	83.44	2 15/16	23.04.....	460.80
1 5/16	4.600.....	92.00	3	24.03.....	480.60
1 3/8	5.049.....	100.98	3 3/16	27.13.....	542.60
1 7/16	5.518.....	110.36	3 1/4	28.21.....	564.20
1 1/2	6.008.....	120.16	3 5/16	29.30.....	586.00
1 1/16	6.519.....	130.38	3 3/8	30.42.....	608.40
1 1/8	7.051.....	141.02	3 7/16	31.55.....	631.00
1 11/16	7.604.....	152.08	3 1/2	32.71.....	654.20
1 3/4	8.178.....	163.56			

ROUND — TURNED AND POLISHED**Stock Lengths 20 Feet Random**

3 5/8	35.09.....	701.80	4 3/4	60.25.....	1205.00
3 11/16	36.31.....	726.20	4 15/16	65.10.....	1302.00
3 3/4	37.55.....	751.00	5	66.76.....	1335.20
3 7/8	40.10.....	802.00	5 1/4	73.60.....	1472.00
3 15/16	41.40.....	828.00	5 5/16	78.95.....	1579.00
4	42.73.....	854.60	5 1/2	80.78.....	1615.60
4 3/16	46.83.....	936.00	5 3/4	88.29.....	1766.00
4 1/4	48.23.....	964.60	6	96.13.....	1922.60
4 1/2	54.08.....	1081.60			

Stock Lengths 12 Feet Random

6 1/2	112.82.....	2256.00	8	170.90.....	3481.00
7	130.85.....	2617.00	9	216.30.....	4326.00
7 1/2	150.02.....	3004.00	10	267.00.....	5340.00

C1018 COLD FINISHED STEEL BARS (Cont.)

Spec. QQ-S-633

Stock Lengths 12 Feet Random — Color Code — White

Size Inches	Approx. Weight, Lbs. per Lin. Ft.	Size Inches	Approx. Weight, Lbs. per Lin. Ft.	12 Ft.
SQUARE				
1/8 . . . . .	.053 . . . . .	.636	1 1/8	4.303
3/16 . . . . .	.120	1.44	1 1/4	5.313
1/4 . . . . .	.213	2.56	1 1/8	6.428
5/16 . . . . .	.332	3.98	1 1/2	7.650
3/8 . . . . .	.478	5.74	1 5/8	8.978
7/16 . . . . .	.651	7.81	1 3/4	10.41
1/2 . . . . .	.850	10.20	2	13.60
9/16	1.076	12.91	2 1/8	15.35
5/8	1.328	15.94	2 1/4	17.21
1 1/16	1.607	19.28	2 1/2	21.25
3/4	1.913	22.96	2 3/4	25.71
7/8	2.603	31.24	3	30.60
1 5/16	2.988	35.86	3 1/2	41.65
1	3.400	40.80	4	54.40
1 1/16	3.838	46.06	4 1/2	59.64

HEXAGON

1/4 . . . . .	.184	2.21	1 5/16	5.072	60.86
5/16 . . . . .	.288	3.46	1 3/8	5.567	66.80
3/8 . . . . .	.414	4.97	1 7/16	6.085	73.02
7/16 . . . . .	.564	6.77	1 1/2	6.625	79.50
1/2 . . . . .	.736	8.83	1 5/8	7.775	93.30
9/16 . . . . .	.932	11.18	1 3/4	9.018	108.22
5/8	1.150	13.80	1 13/16	9.67	116.10
1 1/16	1.392	16.70	1 7/8	10.35	124.20
3/4	1.656	19.87	2	11.78	141.36
13/16	1.944	23.33	2 1/8	13.30	159.60
7/8	2.254	27.05	2 1/4	14.91	178.93
1 5/16	2.588	31.06	2 1/2	18.40	220.80
1	2.944	35.33	3 3/4	22.27	267.24
1 1/16	3.324	39.89	3	26.50	318.00
1 1/8	3.727	44.72	3 1/2	36.07	432.84
1 3/16	4.152	49.82	4	47.11	565.30
1 1/4	4.601	55.21			

SPECIAL FINISH STEEL SHAFTING

Ground and Polished — Spec. QQ-S-633

Shafting of this type, produced by centerless grinding cold drawn bars, combines the greater strength obtained by the cold drawing process, with the highest attainable degree of accuracy and concentricity, and a perfect surface finish.

Special Finish Shafting is die drawn, ground and carefully straightened. It is recommended for applications of high speed operations where higher than average tensile strength is required.

Diameter Tolerance — Exact to .002 inch under

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Length	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Length
C1018 — COLOR CODE — WHITE					
18 to 20 Foot Lengths					
1/4 . . . . .	.1669	3.34	1/2 . . . . .	.6676	13.37
5/16 . . . . .	.2608	5.22	5/8	1.043	20.89
3/8 . . . . .	.3755	7.52	3/4	1.502	30.08
7/16 . . . . .	.5111	10.23	7/8	2.045	40.96
1/2 . . . . .	.6676	13.35	1 1/16	2.347	47.01
5/8	1.043	20.86	1 1/8	2.670	53.48
C1045 — COLOR CODE — RED					
Exact 20 Foot-1/4 Inch Lengths					
1/2 . . . . .	.6676	13.37	1 1/8	3.015	60.39
5/8	1.043	20.89	1 1/4	3.380	67.70

C1045 PRECISION STEEL SHAFTING**Spec. QQ-S-633 — Turned, Ground and Polished****Color Code — Red****Stock Lengths 20 Feet and 1/4 Inch, Exact**

Diameter Tolerance—To and including 2 $\frac{7}{16}$ " exact to .002" under; over 2 $\frac{7}{16}$ " exact to .003" under.

Precision Shafting represents the highest degree of straightness, accuracy, concentricity and surface perfection attainable in commercial practice, being turned and centerless ground to close limits over its entire length, and burnished to a high finish after grinding. The fact that turning does not alter the physical properties of the bar is an important feature.

Precision Shafting meets all requirements of exactness, finish and straightness requisite to noiseless, high efficiency operation and eliminates many of the difficulties encountered in assembling intricate machinery.

It is particularly adapted for high speed work and its perfect surface adds materially to the appearance of the installation.

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.
1 $\frac{3}{16}$	3.766	2 $\frac{1}{4}$	13.52
1 $\frac{1}{4}$	4.172	2 $\frac{7}{16}$	15.87
1 $\frac{3}{8}$	5.049	2 $\frac{1}{2}$	16.69
1 $\frac{7}{16}$	5.518	2 $\frac{1}{16}$	19.29
1 $\frac{1}{2}$	6.008	2 $\frac{3}{4}$	20.19
1 $\frac{5}{8}$	7.051	2 $\frac{15}{16}$	23.04
1 $\frac{11}{16}$	7.604	3	24.03
1 $\frac{3}{4}$	8.178	3 $\frac{1}{8}$	26.12
1 $\frac{7}{8}$	9.388	3 $\frac{3}{16}$	27.13
1 $\frac{15}{16}$	10.02	3 $\frac{7}{16}$	31.55
2	10.68	3 $\frac{11}{16}$	36.31
2 $\frac{3}{16}$	12.78	3 $\frac{15}{16}$	41.40
	255.96		828.86

B1113 COLD FINISHED SCREW STOCK**Spec. QQ-S-633 — Color Code — Black****Tensile Strength 75/95000 P.S.I. — 12 Foot Random Lengths**

For higher surface speeds, greater feeds, longer tool life and better surface finish, "X" Steels have been machined successfully at surface speeds as high as 350 feet per minute. Average machining speed is 225 feet per minute and machinability rating is 155% as compared with B1112.

Size Inches	Approx. Weight, Lbs. per Lin. Ft.	Size Inches	Approx. Weight, Lbs. per Lin. Ft.
ROUND			
3/32	.023	.28	.511
7/64	.032	.38	.587
1/8	.042	.50	.627
9/64	.053	.64	.667
5/32	.065	.78	.710
11/64	.079	.95	.754
3/16	.094	1.13	.845
13/64	.110	1.32	.893
7/32	.128	1.53	.941
15/64	.147	1.76	1.043
1/4	.167	2.00	1.100
17/64	.188	2.22	1.150
9/32	.211	2.53	1.262
19/64	.235	2.82	1.380
5/16	.261	3.13	1.502
21/64	.288	3.46	1.630
11/32	.316	3.79	1.763
23/64	.345	4.14	2.044
3/8	.376	4.51	2.193
25/64	.407	4.88	2.347
13/32	.441	5.29	2.506
27/64	.475	5.70	(Continued on Page 171)

B1113 COLD FINISHED SCREW STOCK (Cont.)

Spec. QQ-S-633 — Color Code — Black

Tensile Strength 75/95000 P.S.I. — 12 Foot Random Lengths

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.
	12 Ft.		12 Ft.

ROUND

1	2.67	32.04	2 1/4	13.52	162.20
1 1/16	3.02	36.18	2 5/16	14.28	171.40
1 1/8	3.38	40.56	2 3/8	15.06	180.70
1 3/16	3.77	45.19	2 7/16	15.87	190.44
1 1/4	4.17	50.08	2 1/2	16.69	200.30
1 5/16	4.60	55.20	2 5/8	18.40	220.80
1 3/8	5.05	60.59	2 3/4	20.19	242.40
1 7/16	5.52	66.22	2 7/8	22.07	264.80
1 1/2	6.01	70.12	2 15/16	23.04	276.50
1 9/16	6.52	78.24	3	24.03	288.40
1 5/8	7.05	84.61	3 1/8	26.08	312.96
1 11/16	7.60	91.25	3 1/4	28.21	338.50
1 3/4	8.18	98.14	3 1/2	32.71	392.50
1 13/16	8.77	105.30	3 3/4	37.55	450.60
1 7/8	9.39	112.70	4	42.73	512.76
1 15/16	10.02	120.20	4 1/4	48.24	578.88
2	10.68	128.20	4 1/2	54.08	648.96
2 1/16	11.36	136.32	5	66.76	801.12
2 1/8	12.06	144.70	5 1/2	80.78	969.36
2 3/16	12.78	153.40			

SQUARE

1/8	.053	.64	7/8	2.60	31.20
3/16	.120	1.44	1 5/16	2.99	35.88
1/4	.213	2.56	1	3.40	40.80
5/16	.332	3.98	1 1/8	4.30	51.60
3/8	.478	5.74	1 3/16	4.80	57.60
7/16	.651	7.81	1 1/4	5.31	63.72
1/2	.850	10.20	1 3/8	6.43	77.16
9/16	1.076	12.91	1 1/2	7.65	91.80
5/8	1.328	15.94	1 3/4	10.41	124.92
1 1/16	1.607	19.28	2	13.60	163.20
3/4	1.913	22.96			

HEXAGON

5/32	.072	.86	1 1/16	3.32	39.89
3/16	.104	1.25	1 1/8	3.73	44.72
1/4	.184	2.21	1 3/16	4.15	49.80
9/32	.233	2.80	1 1/4	4.60	55.21
5/16	.288	3.46	1 5/16	5.07	60.86
1 1/32	.348	4.18	1 3/8	5.57	66.80
3/8	.414	4.97	1 7/16	6.09	73.02
1 3/32	.486	5.83	1 1/2	6.63	79.50
7/16	.564	6.77	1 9/16	7.19	86.27
1/2	.736	8.83	1 5/8	7.78	93.30
9/16	.932	11.18	1 11/16	8.39	100.62
5/8	1.150	13.80	1 3/4	9.02	108.21
1 1/16	1.392	16.70	1 7/8	10.35	124.20
3/4	1.656	19.87	2	11.78	141.36
1 3/16	1.944	23.33	2 1/4	14.91	178.93
7/8	2.254	27.05	2 1/2	18.40	220.80
1 5/16	2.588	31.06	2 3/4	22.27	267.24
1	2.944	35.34	3	26.50	318.00

C1117 ROUND COLD FINISHED STEEL BARS**Spec. QQ-S-633 — Color Code — Blue****Stock Lengths 12 Feet Random**

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	12 Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	12 Ft.
3/16	.094	1.13	15/16	4.600	55.20
1/4	.167	2.00	1 1/8	5.049	60.59
5/16	.261	3.13	1 1/4	5.518	66.22
3/8	.376	4.51	1 1/2	6.008	72.10
13/32	.441	5.29	1 5/16	6.520	78.24
7/16	.511	6.13	1 5/8	7.051	84.61
1/2	.668	8.02	1 3/4	8.178	98.14
9/16	.845	10.14	1 11/16	10.02	120.20
5/8	1.043	12.52	2	10.68	128.20
1 1/16	1.262	15.14	2 1/4	13.52	162.20
3/4	1.502	18.02	2 3/8	15.06	180.70
13/16	1.763	21.16	2 1/2	16.69	200.30
1 5/16	2.347	28.16	2 3/4	20.20	242.40
1	2.670	32.04	2 7/8	22.07	264.80
1 1/16	3.014	36.17	3	24.03	288.40
1 1/8	3.379	40.55	3 1/4	28.21	338.50
1 3/16	3.766	45.19	3 1/2	32.71	392.50
1 1/4	4.173	50.08	3 3/4	37.55	450.60

C1137 COLD FINISHED STEEL BARS**Spec. QQ-S-633 — Color Code — Pink****Stock Lengths 12 Feet Random**

This is medium grade steel possessing higher mechanical properties than other medium carbon steels, plus free machining properties. Average surface cutting speed is 120 feet per minute.

Size Inches	Approx. Weight, Lbs. per Lin. Ft.	12 Ft.	Size Inches	Approx. Weight, Lbs. per Lin. Ft.	12 Ft.
ROUND					
5/16	.261	3.13	1 1/16	3.014	36.17
3/8	.376	4.51	1 1/8	3.379	40.55
7/16	.511	6.13	1 1/4	4.173	50.08
1/2	.668	8.02	1 5/16	4.600	55.20
9/16	.845	10.14	1 3/8	5.049	60.59
5/8	1.043	12.52	1 1/2	6.008	72.10
1 1/16	1.262	15.14	1 5/8	7.051	84.61
3/4	1.502	18.02	1 3/4	8.178	98.14
13/16	1.763	21.16	2	10.680	128.20
7/8	2.044	24.53	2 1/8	12.060	144.70
1 5/16	2.347	28.16	2 5/16	14.280	171.36
1	2.670	32.04			

HEXAGON

3/8	.414	4.97	1	2.944	35.33
7/16	.564	6.77	1 1/8	3.727	44.72
1/2	.736	8.83	1 1/4	4.601	55.21
9/16	.932	11.18	1 3/8	5.567	66.80
1 1/16	1.392	16.70	1 1/2	6.625	79.50
3/4	1.656	19.87	1 3/4	9.018	108.22
7/8	2.254	27.05	2	11.78	141.36

BAR STOCK PROBLEMS?

Ducommun metallurgists and bar stock specialists welcome the opportunity to analyze your screw stock problems.

C1144 ROUND COLD FINISHED STRAIN TEMPERED STEEL BARS

Spec. QQ-S-633 — Color Code — Brown

Stock Lengths 12 Feet Random

A steel of good machinability, high strength and wearability, requiring no heat treatment. Internal stresses have been relieved eliminating cracking and distortion during machining. Average surface cutting speed is 125 feet per minute. Minimum yield point $\frac{3}{8}$ to 2" incl. 100,000 P.S.I. Over 2" to $3\frac{3}{8}$ " incl. 90,000 P.S.I.

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.
	12 Ft.		12 Ft.
$\frac{1}{4}$	.17.....	$1\frac{5}{8}$	7.05.....
$\frac{3}{8}$	.38.....	$1\frac{11}{16}$	7.60.....
$\frac{7}{16}$	.51.....	$1\frac{3}{4}$	8.18.....
$\frac{1}{2}$	.67.....	$1\frac{13}{16}$	8.77.....
$\frac{9}{16}$	.85.....	$1\frac{7}{8}$	9.39.....
$\frac{5}{8}$	1.04.....	$1\frac{15}{16}$	10.02.....
$1\frac{1}{16}$	1.26.....	2.....	10.68.....
$\frac{3}{4}$	1.50.....	$2\frac{1}{16}$	11.36.....
$1\frac{3}{16}$	1.76.....	$2\frac{1}{8}$	12.06.....
$\frac{7}{8}$	2.04.....	$2\frac{3}{16}$	12.78.....
$1\frac{5}{16}$	2.35.....	$2\frac{1}{4}$	13.52.....
1	2.67.....	$2\frac{3}{8}$	15.06.....
$1\frac{1}{16}$	3.02.....	$2\frac{7}{16}$	15.87.....
$1\frac{1}{8}$	3.38.....	$2\frac{5}{8}$	18.40.....
$1\frac{3}{16}$	3.77.....	$2\frac{3}{4}$	20.20.....
$1\frac{1}{4}$	4.17.....	$2\frac{13}{16}$	21.12.....
$1\frac{5}{16}$	4.60.....	$2\frac{7}{8}$	22.07.....
$1\frac{3}{8}$	5.05.....	$2\frac{15}{16}$	23.04.....
$1\frac{7}{16}$	5.52.....	3.....	24.03.....
$1\frac{1}{2}$	6.01.....	$3\frac{1}{8}$	26.08.....
$1\frac{1}{16}$	6.52.....	$3\frac{1}{4}$	28.21.....

LEADED COLD FINISHED STEEL BARS

Grade "A" and Grade "B" — Spec. QQ-S-633

Color Code: Grade A — Green — Grade B — Orange

Stock Lengths 12 Feet Random

TYPICAL ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur	Lead
Grade A .15 Max.....	.75/1.25.....	.04/.09.....	.20/.34.....	.15/.35
Grade B .15 Max.....	.85/1.35.....	.04/.09.....	.40 Min.....	.15/.35

TYPICAL MECHANICAL PROPERTIES

Tensile Strength	Yield Strength	Elongation in 2-inches	Reduction of Area
76,000 P.S.I.....	70,000 P.S.I.....	15%.....	55%.....

This steel is a lead bearing, cold finished, free machining open hearth product. The chemistry is designed specifically to provide the finest machinability and yet retain the desirable qualities of an open hearth steel; while the chemistry usually falls within the ranges shown, it is not subject to check analysis. It is both resulphurized and rephosphorized and contains about one quarter of one per cent lead. The addition of lead lowers the friction component of the metal resulting in longer tool life.

Leaded Steel is sold on improved machining performance, with average surface cutting speeds of: Grade A—290 feet per minute; Grade B—350 feet per minute.

Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.	Diam. Inches	Approx. Weight, Lbs. per Lin. Ft.
	12 Ft.		12 Ft.

ROUND — GRADE "A"

$\frac{3}{32}$	.023.....	.28	$\frac{5}{16}$	.261.....	3.13
$\frac{1}{8}$	.042.....	.50	$1\frac{1}{32}$	.316.....	3.79
$\frac{5}{32}$	.065.....	.78	$\frac{3}{8}$	.375.....	4.51
$\frac{3}{16}$	.094.....	1.13	$1\frac{13}{32}$	.441.....	5.29
$\frac{7}{32}$	.128.....	1.53	$1\frac{5}{32}$	.587.....	7.04
$\frac{1}{4}$	.167.....	2.00	$\frac{7}{16}$	.511.....	6.31
$\frac{9}{32}$	.211.....	2.53	(Continued on Page 174)		

LEADED COLD FINISHED STEEL BARS (Cont.)**Grade "A" and Grade "B" — Spec. QQ-S-633****Color Code: Grade A — Green — Grade B — Orange****Stock Lengths 12 Feet Random****TYPICAL ANALYSIS**

Carbon	Manganese	Phosphorus	Sulphur	Lead
Grade A .15 Max.....	.75/1.25.....	.04/.09.....	.20/.34.....	.15/.35
Grade B .15 Max.....	.85/1.35.....	.04/.09.....	.40 Min.....	.15/.35

TYPICAL MECHANICAL PROPERTIES

Tensile Strength	Yield Strength	Elongation in 2-Inches	Reduction of Area
76,000 P.S.I.....	70,000 P.S.I.....	15%.....	.55%.....

Size Inches	Approx. Weight, Lbs. per Lin. Ft.	Size Inches	Approx. Weight, Lbs. per Lin. Ft.
1/2 .....	.667	8.01	4.60
1 1/32 .....	.754	9.05	5.05
5/16 .....	.845	10.14	5.52
1 1/32 .....	.941	11.29	6.01
5/8	1.04	12.52	6.52
2 1/32	1.15	13.80	7.05
1 1/16	1.26	15.14	7.60
2 3/32	1.38	16.56	8.18
3/4	1.50	18.02	9.39
2 5/32	1.63	19.56	10.68
1 13/16	1.76	21.16	12.06
7/8	2.05	24.54	13.52
1 5/16	2.35	28.16	14.28
1	2.67	32.04	15.06
1 1/16	3.02	36.18	16.69
1 3/32	3.19	38.28	18.40
1 1/8	3.38	40.56	20.19
1 1/16	3.77	45.19	22.07
1 1/4	4.17	50.08	24.03

ROUND — GRADE "A"

1/2 .....	.667	8.01	1 5/16	4.60	55.20
1 1/32 .....	.754	9.05	1 3/8	5.05	60.59
5/16 .....	.845	10.14	1 7/16	5.52	66.22
1 1/32 .....	.941	11.29	1 1/2	6.01	70.12
5/8	1.04	12.52	1 5/16	6.52	78.24
2 1/32	1.15	13.80	1 5/8	7.05	84.61
1 1/16	1.26	15.14	1 11/16	7.60	91.25
2 3/32	1.38	16.56	1 3/4	8.18	98.14
3/4	1.50	18.02	1 7/8	9.39	112.70
2 5/32	1.63	19.56	2	10.68	128.20
1 13/16	1.76	21.16	2 1/8	12.06	144.70
7/8	2.05	24.54	2 1/4	13.52	162.20
1 5/16	2.35	28.16	2 5/16	14.28	171.40
1	2.67	32.04	2 3/8	15.06	180.70
1 1/16	3.02	36.18	2 1/2	16.69	200.30
1 3/32	3.19	38.28	2 5/8	18.40	220.80
1 1/8	3.38	40.56	2 3/4	20.19	242.40
1 1/16	3.77	45.19	2 7/8	22.07	264.80
1 1/4	4.17	50.08	3	24.03	288.40

ROUND — GRADE "B"

7/32 .....	.128	1.54	1 13/16	1.76	21.16
5/16 .....	.261	3.13	7/8	2.05	24.54
3/8 .....	.376	4.51	1 5/16	2.35	28.16
7/16 .....	.511	6.31	1	2.67	32.04
1/2 .....	.667	8.01	1 1/16	3.02	36.18
9/16 .....	.845	10.14	1 1/8	3.38	40.56
5/8	1.04	12.52	1 1/4	4.17	50.08
1 1/16	1.26	15.14	1 1/2	6.01	70.12
3/4	1.50	18.02	1 5/8	7.77	93.24

HEXAGON — GRADE "A"

1/4 .....	.184	2.21	1 13/16	1.94	23.33
5/16 .....	.288	3.45	7/8	2.25	27.05
3/8 .....	.414	4.97	1 5/16	2.59	31.06
13/32 .....	.486	5.83	1	2.95	35.34
7/16 .....	.564	6.76	1 1/16	3.32	39.89
1/2 .....	.736	8.83	1 1/8	3.73	44.72
9/16 .....	.932	11.18	1 1/4	4.60	55.21
5/8	1.15	13.80	1 3/8	5.57	66.84
11/16	1.39	16.70	1 1/2	6.63	79.50
3/4	1.66	19.87	1 5/8	7.77	93.24

HEXAGON — GRADE "B"

7/16 .....	.564	6.76	1 1/16	1.39	16.70
1/2 .....	.736	8.83	3/4	1.66	19.87
9/16 .....	.932	11.18	1	2.95	35.34
5/8	1.15	13.80	1 5/8	7.77	93.24

C1010 COLD ROLLED STRIP STEEL

Spec. QQ-S-633

No. 2 Temper, No. 2 Bright Finish — No. 4 Round Edge, Rolled, Except as Noted

Color Code: 1/16" thick, Plain; 3/32" thick, Red; 1/8" thick, White

Stock Lengths 12 Feet

Size Inches	Approx. Wt., Lbs. per Lin. Ft.	Length	Size Inches	Approx. Wt., Lbs. per Lin. Ft.	Length
1/16 x 3/8	.080	.960	3/32 x 1 3/4	.558	6.696
1/2	.106	1.272	2	.638	7.656
5/8	.133	1.596	2 1/2	.797	9.564
3/4	.159	1.908	3	.956	11.472
7/8	.186	2.232	1/8 x 1/2	.213	2.556
1	.213	2.556	5/8	.266	3.192
1 1/8	.239	2.868	3/4	.319	3.828
1 1/4	.266	3.192	7/8	.372	4.464
1 1/2	.319	3.828	1	.425	5.100
1 3/4	.372	4.464	1 1/8	.478	5.736
2	.425	5.100	1 1/2	.531	6.372
2 1/2	.531	6.372	1 3/4	.638	7.656
3	.638	7.656	2	.744	8.928
3/32 x 3/8	.120	1.440	2 1/2	.850	10.200
1/2	.159	1.908	2 3/4	1.063	12.756
5/8	.199	2.388	3	1.169	14.028
3/4	.239	2.868	*	1.275	15.300
7/8	.279	3.348	4	1.700	20.400
1	.319	3.828	5	2.125	25.500
1 1/8	.359	4.308	6	2.550	30.600
1 1/4	.398	4.776			
1 1/2	.478	5.736			

*No. 3—Square Edge

COLD ROLLED STRIP STEEL STRAIGHTENED AND CUT

The following information on cold rolled strip will aid in the selection of the proper material for certain classes of work.

Tempers —

No. 1 HARD—For flat work and easy punching where strength and rigidity are required.

No. 2 HALF HARD—For easy blanking, will bend right angles across grain and to a moderate curve with the grain.

No. 3 QUARTER HARD—Will bend double flat across grain and to a sharp angle along the grain.

No. 4 PUNCHED TEMPER—Will bend double either way of the grain. For moulding and similar operations.

No. 5 DEAD SOFT—For deep stamping, severe forming and drawing.

Edges —

No. 1—A perfect round or square smooth edge.

No. 2—A natural round edge.

No. 3—A square edge, produced by slitting, not filed.

No. 4—A round edge, rolled process.

No. 5—A square edge, produced by rolling or filing after slitting.

No. 6—A square edge, rolled.

Finishes —

No. 2—Regular bright finish, suitable for ordinary purposes.

No. 3—A bright finish for plating.

COLD ROLLED STRIP STEEL TOLERANCES

For Thickness — Plus or Minus in Inches

Thickness	3/16" to 1"	1" to 3"	3" to 6" Incl. Width	Dimension on 1 Inch or Wider Is
1/8	.002	.002	.003	Measured
3/32	.002	.002	.0025	3/8 inch in
1/16	.002	.002	.0025	from edge

For Width — Plus or Minus in Inches

No. 3 Edge Only

1/8" thick..... or +.010

3/32" thick..... or +.008

1/16" thick..... or +.005

For Width — Plus or Minus in Inches

No. 4 Edge Only

1/16", 3/32" and 1/8" Thick

1/2" or narrower..... or +.010

Over 1/2" to 1" incl..... or +.015

Over 1" to 2" incl..... or +.025

Over 2" to 6" incl..... or +.04

C1018 FLAT COLD FINISHED STEEL BARS**Spec. QQ-S-633 — Color Code — White****Stock Lengths 12 Feet Random**

Size Inches	Approx. Wt., Lbs. per Lin. Ft.	Size Inches	Approx. Wt., Lbs. per Lin. Ft.		
		12 Ft.			
1/8 x 3/16	.080	.96	1/4 x 1 1/2	1.275	15.30
1/4	.106	1.27	1 1/8	1.381	16.57
5/16	.133	1.60	1 1/4	1.488	17.86
3/8	.159	1.91	2	1.700	20.40
7/16	.186	2.23	2 1/4	1.913	22.96
1/2	.213	2.56	2 1/2	2.125	25.50
5/8	.266	3.19	2 3/4	2.338	28.06
3/4	.319	3.83	3	2.550	30.60
7/8	.372	4.46	3 1/4	2.763	33.16
1	.425	5.10	3 1/2	2.975	35.70
1 1/8	.480	5.76	4	3.400	40.80
1 1/4	.531	6.37	4 1/2	3.825	45.90
1 3/8	.588	7.06	5	4.250	51.00
1 1/2	.638	7.66	5 1/2	4.676	56.11
1 3/4	.744	8.93	6	5.10	61.20
2	.850	10.20	7	5.95	71.40
2 1/4	.956	11.47	8	6.80	81.60
2 1/2	1.063	12.76	10	8.50	102.00
2 3/4	1.169	14.03	12	10.20	122.40
3	1.275	15.03	5/16 x 3/8	.398	4.78
3 1/2	1.488	17.86	7/16	.465	5.58
4	1.700	20.40	1/2	.531	6.37
5	2.125	25.50	5/8	.664	7.97
6	2.550	30.60	3/4	.797	9.56
3/16 x 1/4	.160	1.92	7/8	.930	11.16
3/8	.239	2.87	1	1.063	12.76
1/2	.319	3.83	1 1/8	1.195	14.34
5/16	.398	4.78	1 1/4	1.328	15.94
3/4	.478	5.74	1 3/8	1.461	17.53
7/8	.558	6.70	1 1/2	1.594	19.13
1	.638	7.66	1 3/4	1.859	22.31
1 1/8	.717	8.60	2	2.125	25.50
1 1/4	.797	9.56	2 1/4	2.391	28.69
1 3/8	.877	10.52	2 1/2	2.656	31.87
1 1/2	.956	11.47	2 3/4	2.922	35.06
1 3/4	1.116	13.39	3	3.188	38.26
2	1.275	15.30	3 1/2	3.719	44.63
2 1/4	1.434	17.21	4	4.250	51.00
2 1/2	1.594	19.13	4 1/2	4.781	57.37
2 3/4	1.753	21.04	5	5.313	63.76
3	1.913	22.96	6	6.375	76.50
3 1/2	2.231	26.77	8	8.500	102.00
4	2.550	30.60	10	10.630	127.50
4 1/2	2.869	34.43	12	12.750	153.00
5	3.188	38.26	3/8 x 7/16	.558	6.70
6	3.825	45.90	1/2	.638	7.66
8	5.100	61.20	5/16	.720	8.64
10	6.375	76.50	3/8	.797	9.56
12	7.650	91.80	3/4	.956	11.47
1/4 x 5/16	.266	3.19	7/8	1.116	13.39
3/8	.319	3.83	1	1.275	15.30
7/16	.372	4.46	1 1/8	1.434	17.21
1/2	.425	5.10	1 1/4	1.594	19.13
5/16	.480	5.76	1 3/8	1.750	21.00
5/8	.531	6.37	1 1/2	1.913	22.96
3/4	.638	7.65	1 3/4	2.231	26.77
7/8	.744	8.93	2	2.550	30.60
1	.850	10.20	2 1/4	2.869	34.43
1 1/8	.956	11.47	2 1/2	3.188	38.26
1 1/4	1.063	12.76	2 3/4	3.506	42.07
1 3/8	1.158	13.90	3	3.825	45.90

(Continued on page 177)

C1018 FLAT COLD FINISHED STEEL BARS (Cont.)

Spec. QQ-S-633 — Color Code — White

Stock Lengths 12 Feet Random

Size Inches	Approx. Wt., Lbs. per Lin. Ft.	12 Ft.	Size Inches	Approx. Wt., Lbs. per Lin. Ft.	12 Ft.
3/8 x 3 1/4	4.140	49.68	5/8 x 1 1/8	2.930	35.16
3 1/2	4.463	53.56	1 1/2	3.188	38.26
4	5.100	61.20	1 3/4	3.719	44.63
4 1/2	5.738	68.86	2	4.250	51.00
5	6.375	76.50	2 1/4	4.781	57.37
5 1/2	7.01	84.10	2 1/2	5.313	63.76
6	7.65	91.80	2 3/4	5.844	70.13
7	8.93	107.16	3	6.375	76.50
8	10.20	122.40	3 1/2	7.438	89.26
10	12.75	153.00	4	8.500	102.00
12	15.30	183.60	4 1/2	9.563	114.76
7/16 x 1/2	.744	8.93	5	10.625	127.50
5/8	.930	11.16	5 1/2	11.69	140.26
3/4	1.116	13.40	6	12.75	153.00
7/8	1.302	15.62	7	14.88	178.56
1	1.49	17.90	8	17.00	204.00
1 1/2	2.23	26.76	10	21.25	255.00
1 3/4	2.60	31.20	12	25.50	306.00
2	2.98	35.76	3/4 x 7/8	2.23	26.77
2 1/4	3.35	40.20	1	2.55	30.60
2 1/2	3.72	44.64	1 1/8	2.88	34.56
3	4.46	53.52	1 1/4	3.19	38.26
3 1/2	5.30	63.60	1 3/8	3.50	42.00
4	5.95	71.40	1 1/2	3.83	45.90
5	7.44	89.28	1 5/8	4.14	49.68
6	8.92	107.04	1 3/4	4.46	53.52
1/2 x 5/16	.96	11.52	2	5.10	61.20
5/8	1.063	12.76	2 1/4	5.74	68.86
3/4	1.275	15.30	2 1/2	6.38	76.50
7/8	1.488	17.86	2 3/4	7.01	84.16
1	1.70	20.40	3	7.65	91.80
1 1/4	2.13	25.56	3 1/4	8.29	99.46
1 3/8	2.34	28.00	3 1/2	8.93	107.16
1 1/2	2.55	30.60	4	10.20	122.4
1 5/8	2.76	33.12	4 1/2	11.48	137.7
1 3/4	2.975	35.70	5	12.75	153.0
2	3.400	40.80	5 1/2	14.04	168.5
2 1/4	3.825	45.90	6	15.30	183.6
2 1/2	4.250	51.00	6 1/2	16.58	198.9
2 3/4	4.675	56.10	7	17.85	214.2
3	5.10	61.20	8	20.40	244.8
3 1/4	5.52	66.24	10	25.50	306.0
3 1/2	5.95	71.40	12	30.60	367.2
4	6.80	81.60	7/8 x 1	2.98	35.7
4 1/2	7.65	91.80	1 1/8	3.35	40.2
5	8.50	102.00	1 1/4	3.72	44.6
5 1/2	9.35	112.20	1 3/8	4.09	49.0
6	10.20	122.40	1 1/2	4.46	53.6
7	11.90	142.80	1 3/4	5.21	62.5
8	13.60	163.20	2	5.95	71.4
10	17.00	204.00	2 1/4	6.69	80.3
12	20.40	244.80	2 1/2	7.44	89.3
7/16 x 5/8	1.195	14.35	2 3/4	8.18	98.0
3/4	1.435	17.23	3	8.93	107.1
1 1/4	2.390	28.68	3 1/2	10.41	124.9
1 1/2	2.867	34.43	4	11.90	142.8
5/8 x 3/4	1.594	19.13	4 1/2	13.39	160.7
7/8	1.859	22.31	5	14.88	178.6
1	2.125	25.50	6	17.85	214.2
1 1/8	2.390	28.60	10	29.75	357.0
1 1/4	2.656	31.87	12	35.70	428.4

(Continued on page 178)

C1018 FLAT COLD FINISHED STEEL BARS (Cont.)**Spec. QQ-S-633 — Color Code — White****Stock Lengths 12 Feet Random**

Size Inches	Approx. Wt., Lbs. per Lin. Ft.	Size Inches	Approx. Wt., Lbs. per Lin. Ft.		
		12 Ft.			
1 x 1 1/8	3.83	46.0	1 1/2 x 3 1/4	16.58	198.9
1 1/4	4.25	51.0	3 1/2	17.85	214.2
1 1/2	5.10	61.2	4	20.40	244.8
1 5/8	5.52	66.3	4 1/2	22.95	275.4
1 3/4	5.95	71.4	5	25.50	306.0
2	6.80	81.6	6	30.60	367.2
2 1/4	7.65	91.8	6 1/2	31.16	397.8
2 1/2	8.50	102.0	8	40.80	489.6
2 3/4	9.35	112.2	10	51.00	612.0
3	10.20	122.4	12	61.20	734.4
3 1/4	11.05	132.6	1 3/4 x 2	11.90	142.8
3 1/2	11.90	142.8	2 1/4	13.39	160.7
4	13.60	163.2	2 1/2	14.88	178.6
4 1/2	15.30	183.6	2 3/4	16.32	195.8
5	17.00	204.0	3	17.85	214.2
5 1/2	18.72	224.6	3 1/2	20.83	250.0
6	20.40	244.8	4	23.80	285.6
7	23.80	285.6	5	29.75	357.0
8	27.20	326.4	5 1/2	32.64	391.6
10	34.00	408.0	6	35.70	428.4
12	40.80	489.6	8	47.60	571.2
14	47.60	571.2	10	59.50	714.0
1 1/8 x 1 1/4	4.78	57.4	12	71.40	856.8
1 3/8	5.26	63.1	2 x 2 1/4	15.30	183.6
1 3/4	6.70	80.4	2 1/2	17.00	204.0
2	7.64	91.7	2 3/4	18.72	224.6
2 1/2	9.56	114.7	3	20.40	244.8
3	11.47	137.7	3 1/2	23.80	285.6
4	15.38	183.4	4	27.20	326.4
1 1/4 x 1 3/8	5.85	70.5	4 1/2	30.60	367.2
1 1/2	6.38	76.5	5	34.00	408.0
1 3/4	7.44	89.3	5 1/2	37.44	449.2
2	8.50	102.0	6	40.80	489.6
2 1/4	9.56	114.8	6 1/2	44.20	530.4
2 1/2	10.63	127.6	8	54.40	652.8
2 3/4	11.69	140.3	10	68.00	816.0
3	12.75	153.0	12	81.60	979.2
3 1/4	13.80	165.6	2 1/4 x 2 1/2	19.69	236.3
3 1/2	14.88	178.6	3	22.95	275.4
4	17.00	204.0	5	39.38	472.6
4 1/2	19.13	229.6	6	45.90	550.8
5	21.25	255.0	2 1/2 x 3	25.50	306.0
5 1/2	23.38	280.6	3 1/2	29.75	357.0
6	25.50	306.0	4	34.00	408.0
8	34.00	408.0	5	42.50	510.0
10	42.50	510.0	6	51.00	612.0
12	51.00	612.0	8	68.00	816.0
1 1/2 x 1 3/4	8.93	107.1	10	85.00	1020.0
2	10.20	122.4	12	102.00	1224.0
2 1/4	11.48	137.7	3 x 3 1/2	35.70	428.4
2 1/2	12.75	153.0	4	40.80	489.6
2 3/4	14.04	168.5	5	51.00	612.0
3	15.30	183.6	6	61.20	734.4

INVENTORIES

Our stocks are constantly expanding. If you do not see the material you are looking for listed in this book, call or write the Ducommun office nearest you for information on its availability.

COLD FINISHED CARBON STEEL BARS AND SHAFTING

STANDARD MANUFACTURING TOLERANCES

ROUNDS	Max. of Carbon .28% or less	Max. of Carbon .28% to .55%, incl.	Max. of Carbon over .55% or "Heat-Treated" or Strain Relieved (all carbons)
1" or under.....	.002" minus	.003" minus	.006" minus
Over 1" or 2", incl.....	.003" minus	.004" minus	.008" minus
Over 2" to 4", incl.....	.004" minus	.005" minus	.010" minus
Over 4" to 6", incl.....	.005" minus	.006" minus	.012" minus
Over 6" to 7 $\frac{3}{4}$ ", incl.....	.006" minus	.008" minus	.016" minus

HEXAGONS	Max. of Carbon .28% or less	Max. of Carbon .28% to .55%, incl.	Max. of Carbon over .55% or "Heat-Treated" or Strain Relieved (all carbons)
Up to $\frac{5}{16}$ " incl.....	.002" minus	.003" minus	.006" minus
Over $\frac{5}{16}$ " to 1", incl.....	.003" minus	.004" minus	.008" minus
Over 1" to 2 $\frac{1}{2}$ ", incl.....	.004" minus	.005" minus	.010" minus
Over 2 $\frac{1}{2}$ " to 3 $\frac{1}{16}$ ", incl.....	.005" minus	.006" minus	.012" minus

SQUARES	Max. of Carbon .28% or less	Max. of Carbon .28% to .55%, incl.	Max. of Carbon over .55% or "Heat-Treated" or Strain Relieved (all carbons)
Up to $\frac{5}{16}$ ", incl.....	.003" minus	.004" minus	.008" minus
Over $\frac{5}{16}$ " to 1", incl.....	.004" minus	.005" minus	.010" minus
Over 1" to 2 $\frac{1}{2}$ ", incl.....	.005" minus	.006" minus	.012" minus
Over 2 $\frac{1}{2}$ " to 4", incl.....	.006" minus	.008" minus	.016" minus

FLATS (Width)	Max. of Carbon .28% or less	Max. of Carbon .28% to .55%, incl.	Max. of Carbon over .55% or "Heat-Treated" or Strain Relieved (all carbons)
Up to $\frac{3}{4}$ ", incl.....	.003" minus	.004" minus	.008" minus
Over $\frac{3}{4}$ " to 1 $\frac{1}{2}$ ", incl.....	.004" minus	.005" minus	.010" minus
Over 1 $\frac{1}{2}$ " to 3", incl.....	.005" minus	.006" minus	.012" minus
Over 3" to 4", incl.....	.006" minus	.008" minus	.016" minus
Over 4" to 6", incl.....	.008" minus	.010" minus	.020" minus
Over 6".....	.013" minus	.....	.....

HOT-ROLLED ALLOY STEEL BARS ALLOWANCE FOR MACHINING

Specified Sizes, Inches	Minimum Stock Removal Dec. In. from from a Side Diam.	Specified Sizes, Inches	Minimum Stock Removal Dec. In. from from a Side Diam.
Up to $\frac{5}{8}$ incl.....	0.016...0.032	Over 1 $\frac{1}{2}$ to 2 incl....	0.042...0.084
Over $\frac{5}{8}$ to $\frac{7}{8}$ incl....	0.021...0.042	Over 2 to 2 $\frac{1}{2}$ incl....	0.052...0.104
Over $\frac{7}{8}$ to 1 incl....	0.023...0.046	Over 2 $\frac{1}{2}$ to 3 $\frac{1}{2}$ incl....	0.072...0.144
Over 1 to 1 $\frac{1}{8}$ incl....	0.025...0.050	Over 3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ incl....	0.090...0.180
Over 1 $\frac{1}{8}$ to 1 $\frac{1}{4}$ incl....	0.028...0.056	Over 4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ incl....	0.110...0.220
Over 1 $\frac{1}{4}$ to 1 $\frac{3}{8}$ incl....	0.030...0.060	Over 5 $\frac{1}{2}$ to 6 $\frac{1}{2}$ incl....	0.125...0.250
Over 1 $\frac{3}{8}$ to 1 $\frac{1}{2}$ incl....	0.033...0.066	Over 6 $\frac{1}{2}$ to 8 incl....	0.155...0.310

Recommended Stock Removal For Steel Subject To Magna-Flux Inspection

Up to $\frac{1}{2}$ incl.....	0.030...0.060	Over 2 to 2 $\frac{1}{2}$ incl....	0.125...0.250
Over $\frac{1}{2}$ to $\frac{3}{4}$ incl....	0.045...0.090	Over 2 $\frac{1}{2}$ to 3 $\frac{1}{2}$ incl....	0.156...0.312
Over $\frac{3}{4}$ to 1 incl....	0.060...0.120	Over 3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ incl....	0.187...0.374
Over 1 to 1 $\frac{1}{2}$ incl....	0.075...0.150	Over 4 $\frac{1}{2}$ to 6 incl....	0.250...0.500
Over 1 $\frac{1}{2}$ to 2 incl....	0.090...0.180		

AIRCRAFT QUALITY ALLOY STEEL BARS**E4130 CHROME MOLYBDENUM****Spec. MIL-S-6758 (AA-QQ-S-684 or AN-S-684)**

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
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COLD DRAWN AND NORMALIZED — Condition D-4**Color Code — Gray****ROUND — 10 to 12 Foot Random Lengths**

3/16.....	.094	7/8.....	2.044	1 3/4.....	8.178
1/4.....	.164	1 5/16.....	2.350	1 7/8.....	9.338
5/16.....	.261	1.....	2.670	2.....	10.68
3/8.....	.376	1 1/8.....	3.380	2 1/8.....	12.06
7/16.....	.511	1 1/4.....	4.172	2 1/4.....	13.52
1/2.....	.668	1 5/16.....	4.600	2 3/8.....	15.06
9/16.....	.845	1 3/8.....	5.050	2 1/2.....	16.69
5/8.....	1.043	1 1/2.....	6.008		
3/4.....	1.502	1 5/8.....	7.051		

HOT ROLLED AND NORMALIZED — Condition D-1**Color Code — Black****ROUND — 15 to 18 Foot Random Lengths**

1 5/8.....	7.051	2 3/4.....	20.19	4 3/4.....	60.25
1 3/4.....	8.178	2 7/8.....	22.07	5.....	66.76
1 1/8.....	9.338	3.....	24.03	5 1/2.....	80.77
2.....	10.68	3 1/4.....	28.21	6.....	96.13
2 1/8.....	12.06	3 1/2.....	32.71	6 1/2.....	112.80
2 1/4.....	13.52	3 3/4.....	37.55	7.....	130.85
2 3/8.....	15.06	4.....	42.73	7 1/4.....	140.36
2 1/2.....	16.69	4 1/4.....	48.23	7 1/2.....	150.20
2 5/8.....	18.40	4 1/2.....	54.08		

SQUARE — 10 to 12 Foot Random Lengths

3 1/2.....	41.65
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COLD DRAWN AND HEAT TREATED — Condition F-4**Color Code — Red****ROUND — 10 to 12 Foot Random Lengths**

3/16.....	.094	1 1/16.....	1.262	1 1/8.....	3.380
1/4.....	.167	3/4.....	1.502	1 3/16.....	3.766
5/16.....	.261	13/16.....	1.763	1 1/4.....	4.172
3/8.....	.376	7/8.....	2.044	1 5/16.....	4.600
7/16.....	.511	1 5/16.....	2.347	1 3/8.....	5.049
1/2.....	.668	1.....	2.670	1 7/16.....	5.518
9/16.....	.845	1 1/16.....	3.015	1 1/2.....	6.008
5/8.....	1.043	1 1/8.....			

HEXAGON — 10 to 12 Foot Random Lengths

1/4.....	.164	1 1/16.....	1.392	1 3/16.....	4.152
3/8.....	.414	3/4.....	1.656	1 1/4.....	4.601
7/16.....	.564	7/8.....	2.254	1 5/16.....	5.072
1/2.....	.736	1.....	2.945	1 3/8.....	5.567
9/16.....	.932	1 1/16.....	3.324	1 1/2.....	6.625
5/8.....	1.150	1 1/8.....	3.727		

SQUARE — 10 to 12 Foot Random Lengths

1/2.....	.850	7/8.....	2.603	1 1/2.....	7.650
5/8.....	1.328	1.....	3.400	1 3/4.....	10.410
3/4.....	1.913	1 1/4.....	5.313		

We can furnish Notarized copies of the actual chemical and physical test reports on all our aircraft quality steel.

(Continued on page 181)

AIRCRAFT QUALITY ALLOY STEEL BARS

E4130 CHROME MOLYBDENUM (Cont.)

Spec. MIL-S-6758 (AA-QQ-S-684 or AN-S-684)

COLD DRAWN AND HEAT TREATED — Condition F-4

Color Code — Red

RECTANGULAR — 10 to 12 Foot Random Lengths

Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4 x 1/2	.425	1/2 x 2 1/2	4.25	3/4 x 3	7.650
3/4	.638	3	5.10	4	10.200
1	.850	4	6.80	1 x 1 1/4	4.250
2	1.700	5/8 x 1	2.125	1 1/2	5.100
3/8 x 3/4	.956	1 1/2	3.188	2	6.800
1	1.275	2	4.250	2 1/2	8.500
1 1/2	1.913	2 1/2	5.313	3	10.200
2	2.550	3	6.375	4	13.600
1/2 x 3/4	1.275	3/4 x 1	2.550	1 1/4 x 3	12.750
1	1.700	1 1/4	3.188	1 1/2 x 2	10.200
1 1/4	2.125	1 1/2	3.825	3	15.300
1 1/2	2.550	2	5.100	4	20.400
2	3.40	2 1/2	6.375		

E4140 CHROME MOLYBDENUM

Spec. MIL-S-5626

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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COLD DRAWN AND ANNEALED — Condition C-4

Color Code — Blue

ROUND — 10 to 12 Foot Random Lengths

3/8	.376	1	2.670	1 7/8	9.338
7/16	.511	1 1/8	3.380	2 1/8	12.06
1/2	.668	1 1/4	4.172	2 3/8	15.06
5/8	1.043	1 3/8	5.049	2 1/2	16.69
3/4	1.502	1 1/2	6.008		
7/8	2.045	1 5/8	7.051		

HEXAGON — 10 to 12 Foot Random Lengths

5/8	1.150	7/8	2.254	1	2.945
3/4	1.656	1 5/16	2.588	1 1/4	4.601

HOT ROLLED AND NORMALIZED — Condition D-1

Color Code — Pink

ROUND — 15 to 18 Foot Random Lengths

1 1/2	6.01	2 1/2	16.69	4 1/2	54.08
1 5/8	7.05	2 3/4	20.19	4 3/4	60.25
1 3/4	8.18	3	24.03	5	66.76
1 7/8	9.33	3 1/4	28.21	6	96.13
2	10.68	3 1/2	32.71	7 1/2	150.20
2 1/8	12.06	3 3/4	37.55	8 1/2	192.93
2 1/4	13.52	4	42.73		
2 3/4	20.19	4 1/4	48.23		

METALLURICAL AND ENGINEERING DATA . . .

Ask for this separately-bound section of our general catalog.

It contains: Alloys • Formulae • Analyses • Mechanical Properties
 • Comparison Tables • Specifications • Dimensions •
 Weights • Tolerances • Fabrication Recommendations
 and Other Important Data.

AIRCRAFT QUALITY ALLOY STEEL BARS**E4340 NICKEL CHROME MOLYBDENUM**

Spec. MIL-S-5000

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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COLD DRAWN AND ANNEALED — Condition C-4 — Color Code — Yellow

ROUND — 10 to 12 Foot Random Lengths

3/4	1.502	1 1/2	6.009	2	10.680
1	2.670	1 5/8	7.051	2 1/4	13.520
1 1/8	3.380	1 3/4	8.178	2 1/2	16.690
1 1/4	4.173	1 7/8	9.388		

RECTANGULAR — 10 to 12 Foot Random Lengths

1 1/4 x 3	12.750				
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HOT ROLLED AND ANNEALED — Condition C-1 — Color Code — Brown

ROUND — 15 to 18 Foot Random Lengths

1 1/2	6.008	2 1/2	16.69	4 1/2	54.08
1 5/8	7.051	2 5/8	18.40	4 3/4	60.25
1 3/4	8.180	2 3/4	20.19	5	66.76
1 7/8	9.390	3	24.03	5 1/2	80.78
2	10.68	3 1/4	28.21	6	96.13
2 1/4	13.52	3 1/2	32.71		
2 3/8	15.06	4	42.73		

E4620 NICKEL MOLYBDENUM

Spec. MIL-S-7493 and AMS-6294

Color Code — Aluminum

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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ROUND — COLD DRAWN — 10 to 12 Foot Random Lengths

1 3/4	8.18	2	10.68	2 1/2	16.69
1 7/8	9.39	2 3/8	15.06		

ROUND — HOT ROLLED — 15 to 18 Foot Random Lengths

3 1/4	28.21	5 1/2	80.78		
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E8740 CHROME MOLYBDENUMSpec. MIL-S-6049 Amend. 3 Except Tolerances,
AMS-6322D and AMS-230V

10 to 12 Foot Random Lengths — Color Code — Orange

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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ROUND — SEAM FREE, ANNEALED — COLD DRAWN AND GROUNDED

13/64	.11	29/64	.55	57/64	2.12
17/64	.19	33/64	.71	11/64	2.75
21/64	.29	37/64	.89	15/64	3.47
25/64	.41	41/64	1.57	117/64	4.28

E9310 NICKEL CHROME MOLYBDENUM

Spec. AMS-6260E

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
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ROUND — COLD DRAWN AND ANNEALED — Color Code — White

10 to 12 Foot Random Lengths

1 1/4	4.172	1 3/4	8.178	2 1/4	13.520
1 1/2	6.009	2	10.681	2 1/2	16.690

ROUND — HOT ROLLED AND ANNEALED — Color Code — Purple

10 to 15 Foot Random Lengths

3	24.03	4 1/2	54.07	7	130.9
3 1/4	28.21	5 1/4	73.60	7 1/2	150.2
3 1/2	32.71	5 1/2	80.78		
4	42.73	6 1/2	112.8		

AIRCRAFT QUALITY ALLOY STEEL SHEETS AND PLATES

E4130 CHROME MOLYBDENUM

Spec. MIL-S-18729 (with Exceptions)

NORMALIZED (CONDITION N) OR ANNEALED (CONDITION A)

HOT ROLLED — PICKLED AND OILED

Thickness Dec. In.	Sheet Size Inches	Approx. Wt. Lbs. per Sheet	Thickness Dec. In.	Sheet Size Inches	Approx. Wt. Lbs. per Sheet	
	Sq. Ft.			Sq. Ft.		
.025†	18 x72	1.020	.250	18 x72	10.20	
	36½x72	18.62		36½x72	86.15	
.032†	18 x72	1.306		48 x96	326.40	
	36½x72	23.83	.312	18 x72	12.73	
.036	18 x72	1.467		36½x72	232.32	
	36½x72	13.22		48 x96	395.84	
.040	18 x72	1.632	.375	18 x72	15.30	
	36½x72	14.69		36½x72	137.70	
		29.78		48 x96	279.23	
.050	18 x72	2.040	.500	18 x72	20.40	
	36½x72	18.36		36½x72	183.60	
		37.23		48 x96	372.30	
.063	18 x72	2.570	.625	18 x72	25.50	
	36½x72	23.13		36½x72	229.50	
		46.90		48 x96	465.38	
.080	18 x72	3.264	.750	18 x72	30.60	
	36½x72	29.38		36½x72	275.40	
		59.57		48 x96	558.45	
.090	18 x72	3.672		48 x96	979.20	
	36½x72	33.05	.875§	18 x72	35.70	
		67.01		36½x72	321.30	
.100	18 x72	4.080		48 x144	651.53	
	36½x72	36.72		36½x72	744.60	
		74.46	1.000	18 x72	40.80	
	48 x144	195.84		36½x72	367.20	
.112	18 x72	4.570		48 x144	744.60	
	36½x72	41.13	1.250§	18 x72	51.00	
		83.40		36½x72	459.00	
	48 x144	219.36		48 x144	930.75	
.125	18 x72	5.100	1.500§	18 x72	61.20	
	36½x72	45.90		36½x72	550.80	
		93.08		48 x144	1116.90	
	48 x144	244.80	1.750§	18 x72	71.40	
.160	18 x72	6.528		2.000§	18 x72	81.60
	36½x72	58.75			36½x72	642.60
		119.14			48 x96	734.40
.190	18 x72	7.752	2.000	18 x72	1116.90	
	36½x72	69.77			36½x72	1489.20
		141.47			48 x96	2611.12

†Normalized only

§Annealed only

E4340 NICKEL CHROME MOLYBDENUM

Spec. AMS-6359A (Except Decarburization)

CONDITION ANNEALED — HOT ROLLED, PICKLED AND OILED

Plate Size: 36½ x 144 Inches

Thickness Dec. In.	Approx. Wt. Lbs. per Plate	Thickness Dec. In.	Approx. Wt. Lbs. per Plate
	Sq. Ft.		Sq. Ft.
.250	10.20	1.000	40.80
.375	15.30	1.250	51.00
.500	20.40	1.500	61.20
.625	25.50	1.750	71.40
.750	30.60	2.000	81.60
.875	35.70	2.500	102.00

E4130 AND E4340 SHEET STEEL TOLERANCES

Thickness, Dec. In. Over Incl.	Decimal Inch	Thickness, Dec. In. Over Incl.	Decimal Inch
.018 to .037	±.003	.187 to .250	+.020—.010
.037 to .062	±.004	.250 to .375	+.025—.010
.062 to .078	±.005	.375 to .500	+.030—.010
.078 to .109	±.006	.500 to 1.000	+.040—.010
.109 to .141	±.007	1.000 to 2.000	+.065—.010
.141 to .187	±.008		

A.I.S.I. W-1 CARBON TOOL STEEL BARS**10 Temper — 1.05 % Carbon — Annealed**

An electric furnace melted high quality water hardening carbon tool steel with medium shallow hardening characteristics.

May be used in a broad range of applications making it a preferred general purpose water hardening tool steel. It develops sufficient case depth to insure good service in general purpose cutting tools such as blanking dies, reamers and punches. Mill Shipments only.

Tempering and heat treating data furnished upon request.

ROUND				SQUARE			
Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
5/16	.261	2 1/4	13.52	1/4	.213	1/4	.213
3/8	.376	2 3/8	15.06	3/8	.478	3/8	.478
1/2	.668	2 1/2	16.69	1/2	.850	1/2	.850
9/16	.845	2 5/8	18.40	5/8	1.328	5/8	1.328
5/8	1.043	2 3/4	20.19	3/4	1.913	3/4	1.913
3/4	1.502	3	24.03	7/8	2.603	7/8	2.603
7/8	2.045	3 1/2	32.71	1	3.400	1	3.400
1	2.670	4	42.73	1 1/8	4.303	1 1/8	4.303
1 1/8	3.380	4 1/2	54.08	1 1/4	5.313	1 1/4	5.313
1 1/4	4.172	5	66.76	1 1/2	7.650	1 1/2	7.650
1 3/8	5.049	5 1/2	80.78	1 3/4	10.413	1 3/4	10.413
1 1/2	6.008	6	96.13	2	13.600	2	13.600
1 5/8	7.051	6 1/2	112.82	2 1/4	17.213	2 1/4	17.213
1 3/4	8.178	7	130.85	2 1/2	21.250	2 1/2	21.250
1 7/8	9.388	8	170.90	3	30.600	3	30.600
2	10.68						

RECTANGULAR

Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.
5/16 x 3/4	.797	3/4 x 3	7.65
3/8 x 1	1.280	3/4 x 3 1/2	8.93
3/8 x 1 1/4	1.590	3/4 x 4	10.20
3/8 x 1 1/2	1.920	3/4 x 5	12.75
3/8 x 1 3/4	2.230	3/4 x 6	15.30
5/8 x 2	2.550	1 x 1 1/4	4.25
3/8 x 2 1/4	2.870	1 x 1 1/2	5.10
3/8 x 2 1/2	3.190	1 x 1 3/4	5.95
1/2 x 1	1.700	1 x 2	6.80
1/2 x 1 1/4	2.120	1 x 2 1/4	7.65
1/2 x 1 1/2	2.550	1 x 2 1/2	8.50
1/2 x 1 3/4	2.980	1 x 3	10.20
1/2 x 2	3.400	1 x 3 1/2	11.90
1/2 x 2 1/4	3.830	1 x 4	13.60
1/2 x 2 1/2	4.250	1 x 5	17.00
1/2 x 3	5.100	1 x 5 1/2	18.70
1/2 x 3 1/2	5.950	1 x 6	20.40
1/2 x 4	6.800	1 x 7	23.80
1/2 x 5	8.500	1 1/4 x 2	8.50
5/8 x 1	2.120	1 1/4 x 2 1/2	10.63
5/8 x 1 1/4	2.650	1 1/4 x 3	12.75
5/8 x 1 1/2	3.190	1 1/4 x 3 1/2	14.87
5/8 x 1 3/4	3.720	1 1/4 x 4	17.00
5/8 x 2	4.250	1 1/4 x 5	21.25
5/8 x 2 1/4	4.780	1 1/4 x 6	25.50
5/8 x 2 1/2	5.310	1 1/2 x 2	10.20
3/4 x 1	2.550	1 1/2 x 2 1/2	12.75
3/4 x 1 1/4	3.190	1 1/2 x 3	15.30
3/4 x 1 1/2	3.830	1 1/2 x 4	20.40
3/4 x 1 3/4	4.470	2 x 3	20.40
3/4 x 2	5.100	2 x 5	34.00
3/4 x 2 1/2	5.750	2 x 6	40.80

A.I.S.I. M-2 HIGH SPEED STEEL BARS

Carbon 0.83% Tungsten 6.40%

Chromium 4.15%

Vanadium 1.90%

Molybdenum 5.00%

Annealed

A tungsten-molybdenum high speed steel that gives outstanding performance in all operations for which a general purpose high speed steel is required. Has a wider hardening range than other molybdenum type high speed steels. It has good red hardness and excellent toughness characteristics. Available from local stock.

Tempering and heat treating data furnished upon request.

ROUND — Stock Lengths 10 to 12 Feet

Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.	Dimensions Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4	.167	1 1/8	7.051
5/16	.261	1 1/4	8.178
3/8	.376	1 1/2	9.388
7/16	.511	2	10.68
1/2	.668	2 1/4	13.52
5/8	1.043	2 1/2	16.69
3/4	1.502	3	24.03
7/8	2.045	3 1/4	28.21
1	2.670	3 1/2	32.71
1 1/8	3.380	3 3/4	37.55
1 1/4	4.172	4	42.73
1 3/8	5.049	4 1/4	48.23
1 1/2	6.008		

SQUARE — Stock Lengths 10 to 12 Feet

1/4	.213	1	3.400
5/16	.332	1 1/4	5.313
3/8	.478	1 1/2	6.428
1/2	.850	1 3/4	7.650
5/8	1.328	2	10.41
3/4	1.913		13.60
7/8	2.603		

RECTANGULAR — Stock Lengths 10 to 12 Feet

3/16x1 1/2	.957	5/8x1	2.13
1/4x 3/8	.318	5/8x1 1/4	2.66
1/4x 1/2	.425	5/8x1 1/2	3.19
1/4x 3/4	.638	5/8x1 3/4	3.72
1/4x1	.850	5/8x2	4.25
1/4x1 1/4	1.06	5/8x2 1/2	5.31
1/4x1 1/2	1.28	5/8x3	6.38
1/4x1 3/4	1.49	5/8x3 1/2	7.44
1/4x2	1.70	3/4x1	2.55
5/16x 3/4	.797	3/4x1 1/4	3.19
5/16x1	1.06	3/4x1 1/2	3.83
5/16x1 1/4	1.33	3/4x1 3/4	4.47
5/16x1 1/2	1.59	3/4x2	5.10
3/8x 3/4	.957	3/4x3	7.65
3/8x1	1.28	7/8x1 3/4	5.20
3/8x1 1/4	1.59	7/8x2	5.95
3/8x1 1/8	1.75	1 x 1 1/4	4.25
3/8x1 1/2	1.91	1 x 1 1/2	5.10
3/8x2	2.55	1 x 1 3/4	5.95
3/8x2 1/4	2.87	1 x 2	6.80
3/8x2 1/2	3.19	1 x 2 1/2	8.50
1/2x 5/8	1.06	1 x 3	10.20
1/2x 3/8	1.275	1 x 4	13.60
1/2x1	1.70	1 1/4x2	8.50
1/2x1 1/4	2.12	1 1/4x2 1/2	10.63
1/2x1 1/2	2.55	1 1/2x2	10.20
1/2x2	3.40	2 x 3	20.40
1/2x2 1/2	4.25	2 x 4	27.20
1/2x3	5.10		

A.I.S.I. T1 HIGH SPEED STEEL

Carbon 0.73% Tungsten 18.00% Chromium 4.00% Vanadium 1.15%

The original 18-4-1 high speed steel, having been first introduced in 1904. Melting practice and processing have been improved since that time, but nevertheless it is so properly balanced and the fundamental characteristics so sound, that today it is still a standard, general purpose high speed steel.

Has a wide hardening range. This steel is less susceptible to soft skin during hardening than other types and has good red hardness and roughness. Available in sizes as shown for A.I.S.I. M-2. Many sizes are available from local stock.

A.I.S.I. T4 HIGH SPEED STEEL

Carbon 0.75% Tungsten 18.00% Chromium 4.00% Vanadium 1.15%

Molybdenum 0.75% Cobalt 5.00%

The 5% cobalt content produces a high speed steel with greater red hardness, good wear resistance but with slightly less toughness than A.I.S.I.T1. This steel is particularly recommended for continuous hogging cuts or where the tool must cut dry. Widely used for machining cast iron and non-ferrous alloys. It is generally used for a single point tools. Available in sizes as shown for A.I.S.I. M-2. Many sizes are available from local stock.

HEAT TREATMENT DATA (TOOL STEELS)

Grade		Forge °F Start	Forge °F Finish	Anneal °F	Pre-heat °F	Harden °F	Quench	Temper °F	Temp- er Time Hrs.	Rock- well "C" Scale
T1.....		1900-2000	1700	1650	1500-1550	2350	Oil or Air	1050	2+2	64-66
T4.....	{ High Speed Steel	1900-2000	1700	1650	1500-1550	2375	Oil or Air	1050	2+2	64-66
T8.....		1900-2000	1700	1650	1500-1550	2375	Oil or Air; 1050	1050	2+2	64-66
M-2.....		1850-1950	1700	1600	1400-1500	2250	Oil or Air	1050	2+2	64-66
T1.....	{ Hot Work Steel	1900-2000	1700	1650	1500-1550	2350	Oil or Air	1050	2+2	64-66
S1.....		1800-1900	1650	1450	1200-1250	1750	Oil	1100	4-6	50-52
H11.....		1900-2000	1650	1550	1400-1500	1800	Air	1100	4-6	44-46
D2.....	{ Alloy Tool Steel	1900-2000	1650	1650	1450-1500	1800	Oil or Air	450	3-5	60-62
A2.....		1900-2000	1650	1650	1450-1500	1800	Air	450	3-5	59-61
O-1.....		1800-1900	1550	1450	1200-1250	1475	Oil	400	2-3	61-63
S5.....		1900-2000	1550	1475	1200-1250	1625	Water	750	2-3	57-59

METALLURGICAL AND ENGINEERING DATA

The complete Information Section of our catalog separately bound is available for the asking.

A.I.S.I. O-1 OIL HARDENING NON-DEFORMING TOOL STEEL

Considered as the standard in the field of Oil Hardening Non-deforming Tool Steels. This type of steel eliminates to a great extent the warpage and cracking and other failures encountered in intricate dies made from water hardening tool steels. These steels may be hardened at fairly low temperatures, resulting in minimum volume change. They have deep hardening qualities together with a fine grain structure capable of affording a large production at a single grind and permitting a great many grinds before the tool is worn out.

These steels are particularly recommended for the following uses:

Bakelite molding dies, Broaches, Gages, Hobs and other forming tools, Master tools, Reamers, Stamping and blanking dies, Taps, Test Blocks, Thread rolling dies.

Analysis: Carbon .90 — Chrome .50 — Manganese 1.30 — Tungsten .50

Tempering and heat treating data furnished upon request.

Stock Lengths 10 to 12 Feet

ROUND

Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.	Diameter Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4	.167	2 5/8	18.40
5/16	.261	2 3/4	20.20
3/8	.376	2 7/8	22.07
7/16	.511	3	24.03
1/2	.668	3 1/4	28.20
9/16	.845	3 1/2	32.71
5/8	1.043	3 3/4	37.55
3/4	1.502	4	42.73
7/8	2.044	4 1/4	48.24
1	2.670	4 1/2	54.07
1 1/8	3.379	5	66.76
1 1/4	4.173	5 1/4	73.60
1 3/8	5.049	5 1/2	80.77
1 1/2	6.008	6	96.14
1 5/8	7.051	6 1/4	104.3
1 3/4	8.178	6 1/2	112.8
1 7/8	9.388	7	130.9
2	10.68	7 1/4	140.4
2 1/8	12.06	8	170.9
2 1/4	13.52	9	216.3
2 3/8	15.07	10	267.0
2 1/2	16.69		

SQUARE

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4	.212	1 5/8	8.978
5/16	.332	1 3/4	10.41
3/8	.478	2	13.60
7/16	.651	2 1/4	17.22
1/2	.850	2 1/2	21.25
5/8	1.328	2 3/4	25.71
3/4	1.913	3	30.60
7/8	2.603	3 1/2	41.65
1	3.400	4	54.40
1 1/8	4.303	5	85.00
1 1/4	5.313	6	122.4
1 3/8	6.428	7	166.6
1 1/2	7.650		

(Continued on page 188)

A.I.S.I. O-1 OIL HARDENING NON-DEFORMING TOOL STEEL (Cont.)

Stock Lengths 10 to 12 Feet

RECTANGULAR

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
1/8x1	.425	3/4x3	7.65
3/16x 3/4	.478	3/4x3 1/2	8.93
1/4x 1/2	.425	3/4x4	10.20
1/4x 3/4	.638	3/4x4 1/2	11.48
1/4x1	.850	3/4x5	12.75
1/4x1 1/4	1.06	3/4x6	15.30
1/4x1 1/2	1.28	3/4x7	17.85
1/4x1 3/4	1.49	3/4x8	20.40
1/4x2	1.70	1 x 1 1/4	4.25
1/4x2 1/2	2.12	1 x 1 1/2	5.10
5/16x 1/2	.531	1 x 1 3/4	5.95
5/16x1	1.06	1 x 2	6.80
5/16x2	2.12	1 x 2 1/4	7.65
5/16x2 1/2	2.65	1 x 2 1/2	8.50
3/8x1	1.28	1 x 3	10.20
3/8x1 1/4	1.59	1 x 3 1/4	11.05
3/8x1 1/2	1.92	1 x 3 1/2	11.90
3/8x1 3/4	2.23	1 x 4	13.60
3/8x2	2.55	1 x 4 1/2	15.30
3/8x2 1/4	2.87	1 x 5	17.00
3/8x2 1/2	3.19	1 x 5 1/2	18.70
3/8x3	3.83	1 x 6	20.40
3/8x3 1/2	4.47	1 x 7	23.80
3/8x4	5.10	1 x 8	27.20
3/8x5	6.38	1 1/4x1 1/2	6.38
3/8x6	7.65	1 1/4x2	8.50
1/2x 3/4	1.275	1 1/4x2 1/2	10.63
1/2x1	1.70	1 1/4x3	12.75
1/2x1 1/4	2.12	1 1/4x3 1/2	14.88
1/2x1 1/2	2.55	1 1/4x4	17.00
1/2x1 3/4	2.98	1 1/4x4 1/2	19.13
1/2x2	3.40	1 1/4x5	21.25
1/2x2 1/4	3.83	1 1/4x5 1/2	23.38
1/2x2 1/2	4.25	1 1/4x6	25.50
1/2x3	5.10	1 1/4x7	29.75
1/2x3 1/2	5.95	1 1/4x8	34.00
1/2x4	6.80	1 1/2x2	10.20
1/2x4 1/2	7.65	1 1/2x2 1/2	12.75
1/2x5	8.50	1 1/2x3	15.30
1/2x6	10.20	1 1/2x3 1/2	17.85
5/8x1	2.12	1 1/2x4	20.40
5/8x1 1/4	2.65	1 1/2x4 1/2	22.95
5/8x1 1/2	3.19	1 1/2x5	25.50
5/8x1 3/4	3.72	1 1/2x5 1/2	28.05
5/8x2	4.25	1 1/2x6	30.60
5/8x2 1/4	4.78	1 1/2x7	35.70
5/8x2 1/2	5.31	1 1/2x8	40.80
5/8x2 3/4	5.84	1 1/2x12	61.20
5/8x3	6.38	1 3/4x4	23.80
5/8x3 1/2	7.44	2 x 2 1/2	17.00
5/8x4	8.40	2 x 3	20.40
5/8x4 1/2	9.57	2 x 3 1/2	23.80
5/8x5	10.63	2 x 4	27.20
5/8x6	12.75	2 x 4 1/2	30.60
3/4x1	2.55	2 x 5	34.00
3/4x1 1/4	3.19	2 x 6	40.80
3/4x1 1/2	3.83	2 x 7	47.60
3/4x1 3/4	4.47	2 x 8	54.40
3/4x2	5.10	2 1/2x4	34.00
3/4x2 1/4	5.74	2 1/2x5	42.50
3/4x2 1/2	6.38	3 x 6	61.20

A.I.S.I. S5 TOOL STEEL BARS

Octagon

Carbon 0.60% Manganese 0.75% Molybdenum 0.30%
 Silicon 1.90% Chromium 0.25%

ANNEALED

The outstanding characteristic of A.I.S.I. S5 is toughness at relatively high hardness. When properly quenched and tempered to Rockwell C57-59, it is particularly adapted for resistance to impact and battering, yet maintains a good cutting edge. It may be hardened either in oil or water. Simple shapes and larger sections are usually water quenched and more complicated shapes and smaller sections may be oil quenched.

Tempering and heating treating data furnished upon request.

Stock Lengths 12 to 14 Feet

Size Inches	Approx. Wt. Lbs. per Lin. Ft.	Size Inches	Approx. Wt. Lbs. per Lin. Ft.
1/4 . . . . .	.18	5/8	1.10
5/16 . . . . .	.28	3/4	1.58
3/8 . . . . .	.40	7/8	2.16
1/2 . . . . .	.70	1	2.82

A.I.S.I.-1095 TOOL STEEL SHEETS

Natural — Not Annealed

Hot Rolled, high carbon steel, for knives, cutters, shears, and scissors, saws, gun saws, gun springs, clock springs, shovels and general purposes.

HEAT TREATMENT: Heat to a cherry red and cool in oil.

Carbon Content .90 to 1.10

Sheet Size — 18 Inches Wide by 60 to 72 Inches Random Lengths

Stubs' Gauge	Thickness Dec. Inch	Approx. Wt. Lbs. per Sheet	Stubs' Gauge	Thickness Dec. Inch	Approx. Wt. Lbs. per Sheet		
3/16 . . . . .	.187	7.62	68.58	17 . . . . .	.058	2.36	21.24
5/32 . . . . .	.156	6.35	56.15	18 . . . . .	.049	1.99	17.91
1/8 . . . . .	.125	5.08	45.72	19 . . . . .	.042	1.71	15.39
10 . . . . .	.134	5.45	49.05	20 . . . . .	.035	1.42	12.78
12 . . . . .	.109	4.44	39.96	21 . . . . .	.032	1.30	11.70
13 . . . . .	.095	3.86	34.74	22 . . . . .	.028	1.14	10.26
14 . . . . .	.083	3.37	30.33	23 . . . . .	.025	1.02	9.18
15 . . . . .	.072	2.93	26.37	24 . . . . .	.022 . . . . .	.89	8.01
16 . . . . .	.065	2.64	23.76	25 . . . . .	.020 . . . . .	.85	7.65

BAR STOCK TECHNICAL INFORMATION

Booklets covering steel bar stock physical and chemical properties and fabricating characteristics are available free of charge by calling or writing the Ducommun office nearest you.

SIMONDS FLAT GROUND DIE STEEL

OIL HARDENING

Carbon .85 — .95 Chromium .40 — .60 Manganese 1.00 — 1.25
 Tungsten .40 — .60 Silicon .20 — .40 Vanadium .10 — .20

For Dies, Jigs, Punches, Templates, Gages, Small Tools, Parts, etc.

Size Tolerances: Thickness: $\pm .001"$

Width: $.005 - .000" \text{ (18" Lengths)}$
 $.015 - .000" \text{ (36" Lengths)}$
 Length: $18" +\frac{1}{32}'' - 0" \text{ (Ends Milled)}$
 $36" +\frac{5}{8}''$

Hardening Range: 1450 to 1500 degrees F. Quench in oil 125 degrees F.
 Full heat-treating instructions, including tempering chart, on each package.

Surface Finish: 25 to 35 micro inches with all decarburization and surface defects removed.

Made of chromium-tungsten type high grade alloy tool steel. It is spheroidize annealed for good machinability and consistently uniform hardenability with a minimum of shrinkage or warping.

Widely used for an ever-growing variety of purposes, this non-deforming type steel is particularly suited for making dies, punches, jigs, gages, fixtures, templates, stamps, shims, machine parts and small tools. By eliminating difficult and costly machining operations required to grind ordinary bar stock to size, it enables toolmakers, diemakers, machinists and others using tool and die steels to save valuable time and obtain excellent results on every job. Due to its wide hardening range (1450 to 1500 degrees F.) uniform results with all thicknesses are assured with even the simplest heat-treating equipment—see instructions below.

All sizes are individually packaged, fully protected from rusting and scratching, with dimensions and proper heat-treating instructions clearly indicated. Standard Stock Sizes are ready for immediate delivery.

HEAT-TREATMENT

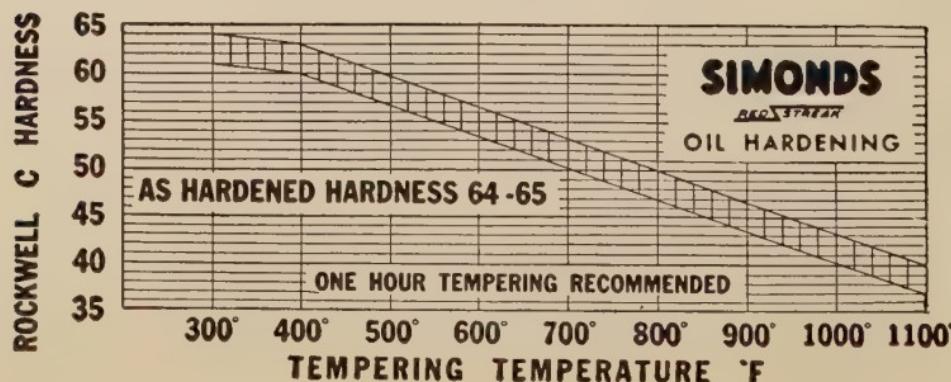
HARDENING

All thicknesses are satisfactorily quenched in oil from a hardening temperature of 1450 to 1500 degrees F. Quenching in water, regardless of water temperature, should not be attempted since this material is oil hardening. It is necessary, before quenching, that the stock be thoroughly and uniformly heated. Temperature of the oil quench should be approximately 125 degrees F.

If commercial quenching oils are not available, motor engine oil SAE 20 or SAE 30 may be substituted. Caution should be exercised to prevent the quenching oil becoming too hot and catching fire. The flash point of motor engine oil SAE 20 is approximately 340 degrees F.

TEMPERING

For filing temper—Heat to a very dark blue. For grinding temper—Heat to a light straw color. For specific Rockwell hardness—Follow chart.



SIMONDS FLAT GROUND DIE STEEL AIR HARDENING

Carbon .95 — 1.05 Chrome 5.00 — 5.50 Manganese .50 — .70
Molybdenum .90 — 1.10 Silicon .30 — .50 Vanadium .20 — .30

For Punches and Dies, Gages, Tools, etc.

Size Tolerances: Thickness: $\pm .001"$
Width: $+.015" - .000"$
Length: $36" + \frac{5}{8}"$ (18" length also available)

Hardening Range: 1700 to 1800 degrees F.—Harden at 1750 degrees F.—Heat uniformly throughout, then soak for 15-20 minutes. Cool in still air. Full heat-treating instructions, including tempering chart, on each package.

Surface Finish: 25 to 35 micro inches with all decarburization and surface defects removed.

The 5% chrome content makes this type of steel more wear resistant than oil hardening types and therefore is ideal for punches and dies for punching silicon or stainless steels, Monel metal, or other types of abrasive metal. It also may be used for gages, tools, etc., where a more wear resistant steel is desired.

Simonds Air Hardening non-deforming type Die Steel is spheroidize annealed for good machinability and consistently uniform hardenability. It has a wide hardening range (1700 to 1800 degrees F.) which makes it practically foolproof in heat-treating.

HEAT-TREATMENT

HARDENING

Hardening range 1700 to 1800 degrees F. Use low side for thin sections; high side for heavy sections. Heat uniformly throughout, then soak for 15-20 minutes. Cool in still air. If pack or atmosphere control furnace methods are used, no preheat required. If open furnace method is used, a preheat of 1450 degrees F. is recommended.

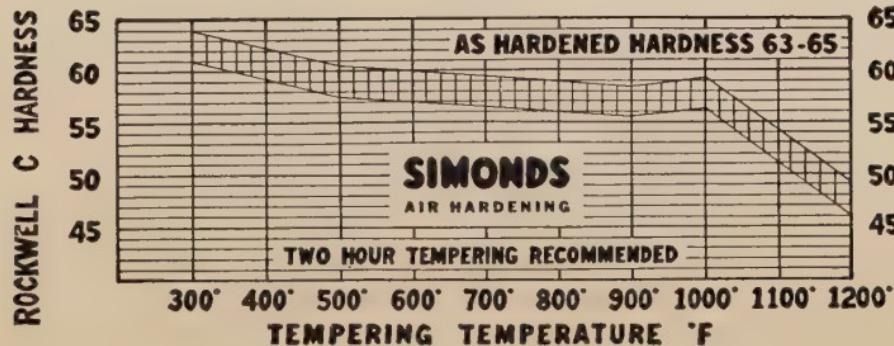
This type steel should be air quenched. Some sections could be oil quenched but oil quenching is not recommended. It is always advisable in quenching tool steels to use the mildest quenching medium which will cool the steel with sufficient rapidity to develop full hardness.

TEMPERING

See tempering chart for desired hardness. Two hour temper recommended. For maximum toughness double temper $1\frac{1}{2}$ hours each temper recommended. For light blanking: Temper 400 to 425 degrees F. For heavy blanking: Temper 700 degrees F.

ANNEALING

1525 to 1575 degree F. Furnace cool at not more than 50 degrees per hour to 800 degrees for maximum softness.



SIMMONDS FLAT GROUND DIE STEEL
STANDARD STOCK SIZES — FLATS AND SQUARES

STANDARD STOCK SIZES — FLATS AND SQUARES

EACH THICKNESS IS FURNISHED IN EVERY WIDTH IN ADJOINING COLUMNS

OIL HARDENING

+18" Only.

STOCK SQUARE SIZES

AIR HARDENING							
OIL HARDENING—18" Lengths				36" Lengths			
$\frac{7}{64}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{13}{64}$	$\frac{7}{32}$	$\frac{1}{4}$
$\frac{1}{8}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{13}{64}$	$\frac{7}{32}$	$\frac{1}{4}$
OIL HARDENING—18" & 36" Lengths							
$\frac{7}{64}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{13}{64}$	$\frac{7}{32}$	$\frac{1}{4}$
$\frac{1}{8}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{11}{64}$	$\frac{3}{16}$	$\frac{13}{64}$	$\frac{7}{32}$	$\frac{1}{4}$

SIMONDS FLAT GROUND DIE STEEL

LOW CARBON

Carbon .18 Silicon .20

Manganese .50 Sulphur .04

Phosphorus .04

For fixtures, machine parts, jigs, stripper plates, etc.

Size Tolerances: Thickness: $\pm .001"$

Width: $+.005 \text{ } -.000"$ (Edges ground on pieces $\frac{3}{4}$ " thick or less—Edges milled on pieces over $\frac{3}{4}$ " thick)

Length: $24" +\frac{1}{4} " -0"$

Hardening: Can be case hardened only.

Surface Finish: 25 to 35 micro inches.

Simonds Low Carbon Steel is used where a heat treated steel is not required, such as templates, stripper plates, etc. This is a fine grained, forging quality, silicon killed steel which can be case hardened only.

Due to its fine grain structure, this steel is more ductile, tougher, more uniformly machineable and has excellent welding qualities. Close control of various mill practices—chemical composition, pouring, forging, rolling, cooling, etc., plus the addition of silicon to the liquid metal which de-oxidizes or “kills” the steel—produces a much sounder structure with excellent forging qualities.

Precision ground with an extra smooth surface finish for accurate layout purposes, standard stock sizes are available from $\frac{1}{16}$ to $1\frac{1}{2}$ inches thick, $\frac{1}{2}$ to 16 inches wide and in $\frac{3}{8}$ to $2\frac{1}{8}$ inch squares.

All sizes are individually packaged, fully protected from rusting and scratching with dimensions clearly indicated.

Case harden if heat treatment is required.

STANDARD STOCK SIZES — FLATS AND SQUARES

Stock Length 24 Inches

Each Thickness Is Furnished in Every Width in Adjoining Columns

Flat Sizes						Square Sizes In.				
Thickness In.	Width In.	Thickness In.	Width In.	Thickness In.	Width In.	1	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$
$\frac{1}{16}$	$\frac{1}{2}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{7}{8}$	1					
	$\frac{3}{4}$		$\frac{3}{4}$	NOT	$1\frac{1}{4}$					
	1		1	FURNISHED IN $14", 16"$	$1\frac{1}{2}$					
	$1\frac{1}{4}$	$\frac{3}{8}$	$1\frac{1}{4}$		2					
$\frac{3}{32}$	$1\frac{1}{2}$		$1\frac{1}{2}$		$2\frac{1}{2}$					
	$1\frac{1}{2}$	$\frac{1}{2}$	2	1	3					
	2		$2\frac{1}{2}$	NOT	$3\frac{1}{2}$					
	$2\frac{1}{2}$		3	FURNISHED IN $14", 16"$	4					
$\frac{1}{8}$	3	$\frac{3}{8}$	$3\frac{1}{2}$		5					
	NOT		4	1 $\frac{1}{4}$	6					
	$3\frac{1}{2}$	FURNISHED IN $1\frac{1}{2}"$	5	NOT	7					
	4		6	FURNISHED IN 1"	8					
$\frac{5}{32}$	5		7		9					
	6	$\frac{3}{4}$	8	1 $\frac{1}{2}$	10					
	8	NOT	9	NOT	12					
	10	FURNISHED IN $1\frac{1}{2}"$	10	FURNISHED IN 1", 1 $\frac{1}{4}"$	14					
$\frac{3}{16}$	12		12		16					

ROUND CARBON TOOL STEEL DRILL RODS

WATER HARDENING — ANNEALED

Carbon 1.00 — Silicon .25 — Manganese .25

Stock Lengths 3 Feet — Also 12 Feet where marked* — Sold only in Full Lengths

§Diam. Size	Dec. Inches	Approx. Wt. Lbs. per Length	§Diam. Size	Dec. Inches	Approx. Wt. Lbs. per Length
2	.20000	32.00	T*	.3580	1.030
1 1/2	.15000	18.00	S	.3480	.975
1 7/16	.14370	16.54	1 1/32	.3437	.939
1 3/8	.13750	15.15	R	.3990	.924
1 5/16	.13120	13.80	Q	.3320	.882
1 1/4*	.12500	12.50	2 1/64	.3281	.861
1 3/16	.11870	11.31	P*	.3230	.831
1 1/8	.11250	10.13	O	.3160	.813
1 1/16	.10650	9.03	5/16*	.3125	.780
1	.10000	8.00	N	.3020	.726
63/64	.9843	7.75	1 1/64	.2968	.702
31/32	.9687	7.59	M	.2950	.699
61/64	.9531	7.25	L	.2900	.675
15/16	.9375	7.00	9/32*	.2812	.639
59/64	.9218	6.79	K	.2810	.636
29/32	.9062	6.56	J	.2770	.615
57/64	.8906	6.35	I	.2720	.594
7/8	.8750	6.13	H	.2660	.564
55/64	.8593	5.91	1 1/64	.2656	.561
27/32	.8437	5.69	G	.2610	.543
53/64	.8281	5.48	F	.2570	.522
13/16	.8125	5.25	E	.2500	.501
51/64	.7968	5.12	1/4*	.2500	.501
25/32	.7812	4.88	D	.2460	.483
49/64	.7656	4.69	C	.2420	.462
3/4*	.7500	4.50	B	.2380	.450
47/64	.7343	4.31	1 1/64	.2343	.441
23/32	.7187	4.13	A	.2340	.441
45/64	.7031	3.94	1*	.2270	.414
11/16	.6875	3.75	2	.2190	.387
43/64	.6718	3.56	7/32*	.2187	.387
21/32	.6562	3.44	3	.2120	.363
41/64	.6406	3.31	4	.2070	.345
5/8*	.6250	3.13	5	.2040	.327
39/64	.6093	3.00	13/64*	.2031	.327
19/32	.5937	2.81	6	.2010	.321
37/64	.5781	2.67	7	.1990	.318
9/16	.5625	2.53	8*	.1970	.312
35/64	.5468	2.39	9	.1940	.297
1 1/32	.5312	2.25	10	.1910	.288
33/64	.5156	2.13	11	.1880	.282
1/2*	.5000	2.00	3/16*	.1875	.282
31/64	.4843	1.88	12	.1850	.276
15/32	.4687	1.75	13	.1820	.267
29/64	.4531	1.63	14	.1800	.261
7/16*	.4375	1.53	15	.1780	.255
27/64	.4218	1.42	16	.1750	.246
Z	.4130	1.37	17	.1720	.237
13/32*	.4062	1.31	1 1/64	.1718	.234
Y	.4040	1.28	18	.1680	.228
X	.3970	1.26	19	.1640	.216
25/64	.3906	1.22	20*	.1610	.207
W	.3860	1.20	21	.1570	.198
V	.3770	1.15	5/32*	.1562	.198
3/8*	.3750	1.13	22	.1550	.195
U	.3680	1.09	23	.1530	.189
23/64	.3593	1.03	24	.1510	.183

ROUND CARBON TOOL STEEL DRILL RODS (Cont.)

Stock Lengths 3 Feet — Also 12 Feet where marked* — Sold only in Full Lengths

Diam. Size or Inches	Dec. Inches	Approx. Wt. Lbs. per Length	Diam. Size or Inches	Dec. Inches	Approx. Wt. Lbs. per Length
25	.1480	.177	43	.0880	.063
26	.1460	.171	44	.0850	.057
27	.1430	.165	45	.0810	.054
28	.1406	.156	46	.0790	.051
29	.1390	.156	28*	.0781	.049
30*	.1340	.144	47	.0770	.048
31	.1270	.129	48	.0750	.045
32	.1250	.126	49	.0720	.042
33	.1200	.117	50	.0690	.039
34	.1150	.108	51	.0660	.036
35	.1120	.102	52	.0630	.033
36	.1100	.096	53	.0625	.030
37	.1093	.093	54	.0580	.027
38*	.1080	.093	55	.0550	.024
39	.1060	.090	56	.0500	.021
40	.1030	.087	57	.0468	.018
41	.1010	.084	58	.0450	.018
42	.0990	.078	59	.0420	.015
43	.0970	.075	60	.0410	.0135
44	.0950	.072	61	.0400	.0129
45	.0930	.069	62	.0390	.0120
46	.0920	.069	63	.0312	.0078

SQUARE CARBON TOOL STEEL DRILL RODS

WATER HARDENING — ANNEALED — LIME DRAWN FINISH

Carbon 1.00 — Silicon .25 — Manganese .28 — Chromium .28

Stock Lengths 3 Feet — Sold only in Full Lengths

Size Inches	Dec. Inches	Approx. Wt. Lbs. per Length	Size Inches	Dec. Inches	Approx. Wt. Lbs. per Length
1/8	.1250	.159	1/2	.5000	2.550
3/16	.1875	.360	5/16	.5625	3.228
1/4	.2500	.636	5/8	.6250	3.984
5/16	.3125	.996	1 1/16	.6875	4.821
3/8	.3750	1.434	3/4	.7500	5.739
7/16	.4375	1.952			

ROUND OIL HARDENING DRILL RODS

CARBON TOOL STEEL — POLISHED

Carbon .90 — Manganese 1.15 — Vanadium .20

Tungsten .50 — Chromium .50

Stock Lengths 3 Feet — Sold only in Full Lengths

Diam. Inches	Dec. Inches	Approx. Wt. Lbs. per Length	Diam. Inches	Dec. Inches	Approx. Wt. Lbs. per Length
2	2.0000	32.000	7/16	.4375	1.530
1 1/2	1.5000	18.000	1 1/32	.4063	1.310
1 1/4	1.2500	12.500	3/8	.3750	1.130
1 1/8	1.1250	10.125	1 1/32	.3438	.940
1	1.0000	8.000	5/16	.3125	.780
1 5/16	.9375	7.000	7/32	.2812	.639
7/8	.8750	6.126	1/4	.2500	.501
13/16	.8125	5.250	7/32	.2187	.387
3/4	.7500	4.500	3/16	.1875	.282
1 1/16	.6875	3.750	5/32	.1562	.198
5/8	.6250	3.130	1/8	.1250	.126
9/16	.5625	2.532	7/32	.0930	.069
1/2	.5000	2.001	1/16	.0625	.030

STANDARD MANUFACTURING TOLERANCES FOR DRILL RODS

Round

1.500 to .500	.0010 + or -
.499 to .125	.0005 + or -
.124 or smaller	.0003 + or -

Square

1" to 3/4"	.0015 + or -
1 1/16" to 1/4"	.0010 + or -
Under 1/4"	.0005 + or -

Tempering and heat treating recommendations furnished upon request.

COMBINED STANDARD STEEL LISTS A.I.S.I & S.A.E.**Basic Open Hearth and Acid Bessemer Carbon Steels for Bars**

The carbon steels listed on this and page 197 include all those grades now regularly furnished under the simplification program of the American Iron and Steel Institute and the Society of Automotive Engineers, Inc., adopted January 21, 1942. Corrected to July, 1957.

Subject to Standard Permissible Variations for Check Analysis

A.I.S.I. Number	Chemical Composition Limits, Per Cent				S.A.E. Number
	Carbon	Manganese	Phosphorus	Sulphur	
C 1005	0.06 Max.	0.35 Max.	0.040 Max.	0.050 Max.	
C 1006	0.08 Max.	0.25/0.40	0.040 Max.	0.050 Max.	1006
C 1008	0.10 Max.	0.25/0.50	0.040 Max.	0.050 Max.	1008
C 1010	0.08/0.13	0.30/0.60	0.040 Max.	0.050 Max.	1010
C 1011	0.08/0.13	0.60/0.90	0.040 Max.	0.050 Max.	
C 1012	0.10/0.15	0.30/0.60	0.040 Max.	0.050 Max.	
C 1013	0.11/0.16	0.50/0.80	0.040 Max.	0.050 Max.	
C 1015	0.13/0.18	0.30/0.60	0.040 Max.	0.050 Max.	1015
C 1016	0.13/0.18	0.60/0.90	0.040 Max.	0.050 Max.	1016
C 1017	0.15/0.20	0.30/0.60	0.040 Max.	0.050 Max.	1017
C 1018	0.15/0.20	0.60/0.90	0.040 Max.	0.050 Max.	1018
C 1019	0.15/0.20	0.70/1.00	0.040 Max.	0.050 Max.	1019
C 1020	0.18/0.23	0.30/0.60	0.040 Max.	0.050 Max.	1020
C 1021	0.18/0.23	0.60/0.90	0.040 Max.	0.050 Max.	1021
C 1022	0.18/0.23	0.70/1.00	0.040 Max.	0.050 Max.	1022
C 1023	0.20/0.25	0.30/0.60	0.040 Max.	0.050 Max.	
C 1024	0.19/0.25	1.35/1.65	0.040 Max.	0.050 Max.	1024
C 1025	0.22/0.28	0.30/0.60	0.040 Max.	0.050 Max.	1025
C 1026	0.22/0.28	0.60/0.90	0.040 Max.	0.050 Max.	1026
C 1027	0.22/0.29	1.20/1.50	0.040 Max.	0.050 Max.	1027
C 1029	0.25/0.31	0.60/0.90	0.040 Max.	0.050 Max.	
C 1030	0.28/0.34	0.60/0.90	0.040 Max.	0.050 Max.	1030
C 1031	0.28/0.34	0.30/0.60	0.040 Max.	0.050 Max.	
C 1032	0.30/0.36	0.60/0.90	0.040 Max.	0.050 Max.	
C 1033	0.30/0.36	0.70/1.00	0.040 Max.	0.050 Max.	1033
C 1034	0.32/0.38	0.50/0.80	0.040 Max.	0.050 Max.	1034
C 1035	0.32/0.38	0.60/0.90	0.040 Max.	0.050 Max.	1035
C 1036	0.30/0.37	1.20/1.50	0.040 Max.	0.050 Max.	1036
C 1037	0.32/0.38	0.70/1.00	0.040 Max.	0.050 Max.	
C 1038	0.35/0.42	0.60/0.90	0.040 Max.	0.050 Max.	1038
C 1039	0.37/0.44	0.70/1.00	0.040 Max.	0.050 Max.	1039
C 1040	0.37/0.44	0.60/0.90	0.040 Max.	0.050 Max.	1040
C 1041	0.36/0.44	1.35/1.65	0.040 Max.	0.050 Max.	1041
C 1042	0.40/0.47	0.60/0.90	0.040 Max.	0.050 Max.	1042
C 1043	0.40/0.47	0.70/1.00	0.040 Max.	0.050 Max.	1043
C 1045	0.43/0.50	0.60/0.90	0.040 Max.	0.050 Max.	1045
C 1046	0.43/0.50	0.70/1.00	0.040 Max.	0.050 Max.	1046
C 1049	0.46/0.53	0.60/0.90	0.040 Max.	0.050 Max.	1049
C 1050	0.48/0.55	0.60/0.90	0.040 Max.	0.050 Max.	1050
C 1051	0.45/0.56	0.85/1.15	0.040 Max.	0.050 Max.	
C 1052	0.47/0.55	1.20/1.50	0.040 Max.	0.050 Max.	1052
C 1053	0.48/0.55	0.70/1.00	0.040 Max.	0.050 Max.	
C 1054	0.50/0.60	0.50/0.80	0.040 Max.	0.050 Max.	
C 1055	0.50/0.60	0.60/0.90	0.040 Max.	0.050 Max.	1055
C 1057	0.50/0.61	0.85/1.15	0.040 Max.	0.050 Max.	
C 1059	0.55/0.65	0.50/0.80	0.040 Max.	0.050 Max.	
C 1060	0.55/0.65	0.60/0.90	0.040 Max.	0.050 Max.	1060
C 1061	0.54/0.65	0.75/1.05	0.040 Max.	0.050 Max.	
C 1062	0.54/0.65	0.85/1.15	0.040 Max.	0.050 Max.	1062
C 1064	0.60/0.70	0.50/0.80	0.040 Max.	0.050 Max.	1064
C 1065	0.60/0.70	0.60/0.90	0.040 Max.	0.050 Max.	1065
C 1066	0.60/0.71	0.85/1.15	0.040 Max.	0.050 Max.	1066
C 1069	0.65/0.75	0.40/0.70	0.040 Max.	0.050 Max.	
C 1070	0.65/0.75	0.60/0.90	0.040 Max.	0.050 Max.	1070
C 1071	0.65/0.76	0.75/1.05	0.040 Max.	0.050 Max.	
C 1072	0.65/0.76	1.00/1.30	0.040 Max.	0.050 Max.	
C 1074	0.70/0.80	0.50/0.80	0.040 Max.	0.050 Max.	1074

COMBINED STANDARD STEEL LISTS (Cont.)

A.I.S.I. and S.A.E.

A.I.S.I. Number	Chemical Composition Limits, Per Cent				S.A.E. No.
	Carbon	Manganese	Phosphorus	Sulphur	
C 1075	0.70/0.80	0.40/0.70	0.040 Max.	0.050 Max.	
C 1078	0.72/0.85	0.30/0.60	0.040 Max.	0.050 Max.	1078
C 1080	0.75/0.88	0.60/0.90	0.040 Max.	0.050 Max.	1080
C 1084	0.80/0.93	0.60/0.90	0.040 Max.	0.050 Max.	
C 1085	0.80/0.93	0.70/1.00	0.040 Max.	0.050 Max.	1085
C 1086	0.80/0.93	0.30/0.50	0.040 Max.	0.050 Max.	1086
C 1090	0.85/0.98	0.60/0.90	0.040 Max.	0.050 Max.	1090
C 1095	0.90/1.03	0.30/0.50	0.040 Max.	0.050 Max.	1095
B 1006	0.08 Max.	0.45 Max.	0.07/0.12	0.060 Max.	
B 1010	0.13 Max.	0.30/0.60	0.07/0.12	0.060 Max.	

Basic Open Hearth Sulphurized Carbon Steels (Open Hearth Steels)

C 1106	0.08 Max.	0.30/0.60	0.040 Max.	0.08/0.13	
C 1108	0.08/0.13	0.50/0.80	0.040 Max.	0.08/0.13	
C 1109	0.08/0.13	0.60/0.90	0.040 Max.	0.08/0.13	1109
C 1110	0.08/0.13	0.30/0.60	0.040 Max.	0.08/0.13	
C 1111	0.08/0.13	0.60/0.90	0.040 Max.	0.16/0.23	
C 1113	0.10/0.16	1.00/1.30	0.040 Max.	0.24/0.33	
C 1114	0.10/0.16	1.00/1.30	0.040 Max.	0.08/0.13	1114
C 1115	0.13/0.18	0.60/0.90	0.040 Max.	0.08/0.13	1115
C 1116	0.14/0.20	1.10/1.40	0.040 Max.	0.16/0.23	1116
C 1117	0.14/0.20	1.00/1.30	0.040 Max.	0.08/0.13	1117
C 1118	0.14/0.20	1.30/1.60	0.040 Max.	0.08/0.13	1118
C 1119	0.14/0.20	1.00/1.30	0.040 Max.	0.24/0.33	1119
C 1120	0.18/0.23	0.70/1.00	0.040 Max.	0.08/0.13	1120
C 1125	0.22/0.28	0.60/0.90	0.040 Max.	0.08/0.13	
C 1126	0.23/0.29	0.70/1.00	0.040 Max.	0.08/0.13	1126
C 1132	0.27/0.34	1.35/1.65	0.040 Max.	0.08/0.13	1132
C 1137	0.32/0.39	1.35/1.65	0.040 Max.	0.08/0.13	1137
C 1138	0.34/0.40	0.70/1.00	0.040 Max.	0.08/0.13	1138
C 1139	0.35/0.43	1.35/1.65	0.040 Max.	0.12/0.20	1139
C 1140	0.37/0.44	0.70/1.00	0.040 Max.	0.08/0.13	1140
C 1141	0.37/0.45	1.35/1.65	0.040 Max.	0.08/0.13	1141
C 1144	0.40/0.48	1.35/1.65	0.040 Max.	0.24/0.33	1144
C 1145	0.42/0.49	0.70/1.00	0.040 Max.	0.04/0.07	1145
C 1146	0.42/0.49	0.70/1.00	0.040 Max.	0.08/0.13	1146
C 1148	0.45/0.52	0.70/1.00	0.040 Max.	0.04/0.07	
C 1151	0.48/0.55	0.70/1.00	0.040 Max.	0.08/0.13	1151
C 1211	0.13 Max.	0.60/0.90	0.07/0.12	0.08/0.15	
C 1212	0.13 Max.	0.70/1.00	0.07/0.12	0.16/0.23	
C 1213†	0.13 Max.	0.70/1.00	0.07/0.12	0.24/0.33	

Acid Bessemer Sulphurized Carbon Steels

B 1111	0.13 Max.	0.60/0.90	0.07/0.12	0.08/0.15	1111
B 1112	0.13 Max.	0.70/1.00	0.07/0.12	0.16/0.23	1112
B 1113‡	0.13 Max.	0.70/1.00	0.07/0.12	0.24/0.33	1113

- Note: (1) Sulphurized steel is not subject to check analysis for sulphur.
(2) Acid Bessemer steel is not furnished with specified silicon content.
(3) Standard silicon limitations are outlined below:
- | | |
|------------------------------------|------------------------------------|
| Up to C1015 Excl. | 0.10 Max. |
| C1015 to C 1025 Incl. | 0.10 Max., 0.10/0.20, or 0.15/0.30 |
| Over C 1025 | 0.10/0.20 or 0.15/0.30 |
| Up to C 1113 Excl. | 0.10 Max. |
| C1113 and over, Open Hearth Grades | .10 Max., .10/.20, .15/.30 |

If other limitations are required, the grade then becomes a nonstandard steel, and silicon must be specified in accordance with the following limitations: 0.10 Max., 0.07/0.15, 0.10/0.20, 0.15/0.30, or 0.30/0.60.

†C-1213 also furnished as RSC 1213 with Carbon, 0.09 Max.

‡B 1113 also furnished as RSB 1113 with Carbon, 0.09 Max.

Meaning of Prefixes for A.I.S.I. Designations

C — Basic open hearth carbon steel.

B — Acid Bessemer carbon steel.

COMBINED STANDARD STEEL LISTS — A.I.S.I. and S.A.E.
Open Hearth Alloy and Electric Furnace Alloy Steels

Open Hearth Alloy and Electric Furnace Alloy Steels

Corrected to July, 1958 — Subject To Standard Permissible Variations for Check Analyses

The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with maximum individual piece

A.I.S.I. No.	Chemical Composition Limits, Per Cent						S.A.E. No.			
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molyb- denum	Vanadium	
1330	.28-.33	1.60-1.90	.040	.040	.20-.35	.....	.....	.....	.....	1330
1335	.33-.38	1.60-1.90	.040	.040	.30-.35	.....	.....	.....	.....	1335
1340	.38-.43	1.60-1.90	.040	.040	.20-.35	.....	.....	.....	.....	1340
1345	.43-.48	1.60-1.90	.040	.040	.20-.35	.....	.....	.....	.....	1345
3140	.38-.43	.70-.90	.040	.040	.20-.35	Nickel-Chromium Steels	.55-.75	.....	.....	3140
E33310	.08-.13	.45-.60	.025	.025	.20-.35	.....	.....	.....	.....	3310†
4012	.09-.14	.75-1.00	.040	.040	.20-.35	.....	.....	.....	.....	4012
4023	.20-.25	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4023
4024	.20-.25	.70-.90	.040	.035-.050	.20-.35	.....	.....	.....	.....	4024
4027	.25-.30	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4027
4028	.25-.30	.70-.90	.040	.035-.050	.20-.35	.....	.....	.....	.....	4028
4037	.35-.40	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4037
4042	.40-.45	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4042
4047	.45-.50	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4047
4063	.60-.67	.75-1.00	.040	.040	.20-.35	.....	.....	.....	.....	4063
4118	.18-.23	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4118
4130	.28-.33	.40-.60	.040	.040	.20-.35	.....	.....	.....	.....	4130
4135	.33-.38	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4135
4137	.35-.40	.70-.90	.040	.040	.20-.35	.....	.....	.....	.....	4137
4140	.38-.43	.75-1.00	.040	.040	.20-.35	.....	.....	.....	.....	4140
4142	.40-.45	.75-1.00	.040	.040	.20-.35	.....	.....	.....	.....	4142

COMBINED STANDARD STEEL LISTS — A.I.S.I. and S.A.E. (Cont.)

A.I.S.I. No.	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Chemical Composition Limits, Per Cent				S.A.E. No.
					Silicon	Nickel	Chromium	Molyb- denum	
Molybdenum Steels (Cont.)									
4145	.43-.48	.75-1.00	.040	.040	.20-.35	.80-.10	.15-.25		4145
4147	.45-.50	.75-1.00	.040	.040	.20-.35	.80-.10	.15-.25		
4150	.48-.53	.75-1.00	.040	.040	.20-.35	.80-.10	.15-.25		4150
4320	.17-.22	.45-.65	.040	.040	.20-.35	.40-.60	.20-.30		4320
4337	.35-.40	.60-.80	.040	.040	.20-.35	.1.65-2.00	.70-.90	.20-.30	
E4337	.35-.40	.65-.85	.025	.025	.20-.35	.1.65-2.00	.70-.90	.20-.30	4337†
4340	.38-.43	.60-.80	.040	.040	.20-.35	.1.65-2.00	.70-.90	.20-.30	4340
E4340	.38-.43	.65-.85	.025	.025	.20-.35	.1.65-2.00	.70-.90	.20-.30	
4422	.20-.25	.70-.90	.040	.040	.20-.35		.35-.45		4422
4427	.24-.29	.70-.90	.040	.040	.20-.35		.35-.45		4427
4520	.18-.23	.45-.65	.040	.040	.20-.35		.45-.60		4520
4615	.13-.18	.45-.65	.040	.040	.20-.35	.1.65-2.00		.20-.30	4615
4617	.15-.20	.45-.65	.040	.040	.20-.35	.1.65-2.00		.20-.30	4617
4620	.17-.22	.45-.65	.040	.040	.20-.35	.1.65-2.00		.20-.30	4620
4621	.18-.23	.70-.90	.040	.040	.20-.35	.1.65-2.00		.20-.30	4621
4718	.16-.21	.70-.90	.040	.040	.20-.35	.90-1.20	.35-.55	.30-.40	4718
4720	.17-.22	.50-.70	.040	.040	.20-.35	.90-1.20	.35-.55	.15-.25	
4815	.13-.18	.40-.60	.040	.040	.20-.35	.3.25-3.75		.20-.30	4815
4817	.15-.20	.40-.60	.040	.040	.20-.35	.3.25-3.75		.20-.30	4817
4820	.18-.23	.50-.70	.040	.040	.20-.35	.3.25-3.75		.20-.30	4820
Chromium Steels									
5015	.12-.17	.30-.50	.040	.040	.20-.35		.30-.50		
5046	.43-.50	.75-1.00	.040	.040	.20-.35		.20-.35		
5115	.13-.18	.70-.90	.040	.040	.20-.35		.70-.90		
5120	.17-.22	.70-.90	.040	.040	.20-.35		.70-.90		

E—Denotes Electric Furnace Alloy Steel.

Refer to Notes on Page 200.

†Electric Furnace.

5046
5115

5120

COMBINED STANDARD STEEL LISTS — A.I.S.I. and S.A.E. (Cont.)

The compositions given below are subject to check analyses and apply to sections less than 10 x 10 inches. American Iron and Steel Institute, Section 10.

A.I.S.I. No.	Carbon	Manganese	Phosphorus Max.	Chemical Composition Limits, Per Cent				S.A.E. No.
				Sulphur Max.	Silicon	Nickel	Chromium	
Nickel-Chromium-Molybdenum Steels (Cont.)								
8630	.28-.33	.70-.90	.040	.20-.35	.40-.70	.40-.60	.15-.25	8630
8637	.35-.40	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8637
8640	.38-.43	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8640
8642	.40-.45	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8642
8645	.43-.48	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8645
8650	.48-.53	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8650
8655	.50-.60	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8655
8660	.55-.65	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.15-.25	8660
8720	.18-.23	.70-.90	.040	.20-.35	.40-.70	.40-.60	.20-.30	8720
8735	.33-.38	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.20-.30	8735
8740	.38-.43	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.20-.30	8740
8742	.40-.45	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.20-.30	8740
8822	.20-.25	.75-1.00	.040	.20-.35	.40-.70	.40-.60	.30-.40	8822
9255	.50-.60	.70-.95	.040	1.80-2.20	.....	.....	.....	9255
9260	.55-.65	.70-1.00	.040	1.80-2.20	.....	.....	.....	9260
9262	.55-.65	.75-1.00	.040	1.80-2.20	.....	.....	.....	9262
E9310	.08-.13	.45-.65	.025	.20-.35	3.00-3.50	1.00-1.40	.08-.15	9310†
9840	.38-.43	.70-.90	.040	.20-.35	.85-1.15	.70-.90	.20-.30	9840
9850	.48-.53	.70-.90	.040	.20-.35	.85-1.15	.70-.90	.20-.30	9850

E—Denotes Electric Furnace Alloy Steel.

NOTE: (1) When electric furnace steel is specified, phosphorus and sulphur contents are to be 0.025% maximum each. For open hearth steels, phosphorus and sulphur contents are to be 0.040% maximum each.

(2) All analyses are subject to the conditions outlined for standard steels in Steel Product Manual No. 29, May, 1949.

(3) Small quantities of certain elements may be found in alloy steel which are not specified

or required. These elements are to be considered as incidental and acceptable to the following maximum amounts: copper, 0.35 per cent; nickel, 0.25 per cent; chromium, 0.20 per cent; molybdenum, 0.06 per cent.

(4) When a grade is specified to a method of manufacture (electric furnace or open hearth) not listed in the above table the phosphorus and sulphur limits shall be, unless otherwise specified, as follows: Basic electric furnace—0.025% max., Basic open hearth—0.040 max.

†Electric Furnace.

APPROXIMATE MECHANICAL PROPERTIES AND RECOMMENDED HEAT TREATMENT

COLD DRAWN AND HOT ROLLED CARBON STEELS

Figures given below are approximate only, representing the average of numerous tests. They are not guaranteed and are given only for use as a guide.

GRADE OF STEEL	AISI B1112 SAE 1112	AISI B1113 SAE 1113	AISI C1115 SAE 1115	AISI C1117 SAE 1117 AISI C1118 SAE 1118
COLD DRAWN				
Tensile Strength—lbs. per sq. in.	80/100,000	80/95,000	70,80/000	75/85,000
Yield Point—lbs. per sq. in.	70/80,000	70/80,000	60/70,000	60/75,000
Elongation in 2 inches—%	10/20	10/20	15/25	15/25
Reduction of Area—%	40/50	40/50	45/55	45/55
Brinell Hardness	170/202	170/202	140/170	143/170

HOT ROLLED (Turned and Polished or Precision Shafting)

Tensile Strength—lbs. per sq. in.	60/80,000	60/80,000	50/70,000	55/75,000
Yield Point—lbs. per sq. in.	35/55,000	35/55,000	25/45,000	30/50,000
Elongation in 2 inches—%	20/30	20/30	25/35	25/35
Reduction of Area—%	30/50	30/50	45/55	45/55
Brinell Hardness	126/150	125/150	110/140	115/140
Recommended Heat Treatment and Quench (degrees Fahrenheit)	Cyanide or Carburize (f)	Cyanide or Carburize (f)	Carburize 1600°—water (a) 1425°—water (b)	Carburize 1600°—water (a) 1425°—water (b)

GRADE OF STEEL	AISI C1137 SAE 1137	AISI C1020 SAE 1020	AISI C1045 SAE 1045	
COLD DRAWN				
Tensile Strength—lbs. per sq. in.	100/120,000	70/85,000	85/115,000	
Yield Point—lbs. per sq. in.	85/100,000	60/70,000	80/100,000	
Elongation in 2 inches—%	10/15	15/25	10/15	
Reduction of Area—%	30/45	45/55	30/45	
Brinell Hardness	187/235	149/170	183/228	

HOT ROLLED (Turned and Polished or Precision Shafting)

Tensile Strength—lbs. per sq. in.	70/90,000	50/70,000	80/100,000	
Yield Point—lbs. per sq. in.	45/65,000	25/45,000	35/55,000	
Elongation in 2 inches—%	20/30	30/40	20/30	
Reduction of Area—%	35/50	50/65	30/45	
Brinell Hardness	152/187	110/140	156/202	
Recommended Heat Treatment and Quench (degrees Fahrenheit)	1525°—water 1575°-1600°—oil (c) (e)	Carburize 1600°—water or brine (a) 1425°—water (b)	1475°—water 1525°—oil (c) (e)	

CODE—RECOMMENDED HEAT TREATMENT

- (a) For maximum core strength.
- (b) For maximum core hardness and minimum distortion.
- (c) Draw to desired hardness.
- (d) Use water quench for heavy, simple sections only.
- (e) Use oil quench for thin or intricate sections.
- (f) Quench at 1600°F from cyanide for best core strength. Carburize only to develop a hard wearing surface as core strength is low.

Note: (a) followed by (b) develops best combination of case and core strength. It is recommended that all carburized parts be given a draw after final quench to relieve strains.

APPROXIMATE BRINELL HARDNESS AND RECOMMENDED HEAT TREATMENT

FOR ALLOY STEELS

Figures for Brinell Hardness given below are approximate only, representing the average of numerous tests. These are not guaranteed and are given only for use as a guide.

GRADE OF STEEL	AISI 4130 SAE 4130 Annealed	AISI 4140 SAE 4140 Annealed	AISI 5150 SAE 5150 Annealed	AISI E52100 SAE 52100 Annealed
ALLOY STEELS				
Brinell Hardness—Cold Drawn	187/217	196/228	187/228	196/241
Brinell Hardness—Hot Rolled	163/212	170/223	170/223	170/223
Recommended Heat Treatment and Quench (degrees Fahrenheit)	1575°—water 1600°—oil (A) (B)	1550°—oil (A)	1510°—oil (A)	1425°—oil (A)

(A) Draw to desired hardness.

(B) Use oil quench for thin or intricate sections.

SURFACE CUTTING SPEEDS FOR COLD DRAWN STEEL ON AUTOMATIC SCREW MACHINES

Speeds given below are approximate and are to be used only as a basis for calculating proper speeds for the part in hand. The figures represent the averages for the general run of parts made from cold drawn steel. Any extraordinary feature of the part to be made should be taken into consideration and speeds altered accordingly. (Grades not listed may be interpolated from the speed and feed values of the listed grades most similar in chemistry.)

AISI Number	SAE Number	Surface Feet per Minute	% Relative Speed Based on AISI B1112 (SAE 1112) As 100%
FREE CUTTING STEELS			
B1112.....	1112.....	165.....	100
B1113.....	1113.....	225.....	136
C1117.....	1117.....	150.....	91
C1137.....	1137.....	120.....	72
C1213.....	.....	225.....	136
C1018.....	1018.....	130.....	78
C1020.....	1020.....	120.....	72
C1040.....	1040.....	105.....	64
4130 annealed.....	4130.....	120.....	72
4140 annealed.....	4140.....	110.....	66
4142 annealed.....	.....	110.....	66
4340 annealed.....	4340.....	95.....	57
8620.....	8620.....	110.....	66

HARDNESS CONVERSION TABLE — APPROXIMATE

Applies to steel of uniform chemical composition and heat treatment.

Not recommended for nonferrous metals or for case hardened steels.

BRINELL Diam. in mm., 3000 Kg. Load 10 mm. Ball	Vickers or Firth- Hardness Number	ROCKWELL			Shore Sclero- scope Number	Approx. Tensile Strength 1000 PSI.
		C	B			
		150 Kg. Load 120° Dia- mond Cone	100 Kg. Load 1/16 inch Diam. Ball			
2.25	745	840	65.3		91	
2.30	710	780	63.3		87	
2.35	682	737	61.7		84	
2.40	653	697	60.0		81	
2.45	627	667	58.7		79	323
2.50	601	640	57.3		77	309
2.55	578	615	56.0		75	297
2.60	555	591	54.7		73	285
2.65	534	569	53.5		71	274
2.70	514	547	52.1		70	263
2.75	495	528	51.0		68	253
2.80	477	508	49.6		66	243
2.85	461	491	48.5		65	235
2.90	444	472	47.1		63	225
2.95	429	455	45.7		61	217
3.00	415	440	44.5		59	210
3.05	401	425	43.1		58	202
3.10	388	410	41.8		56	195
3.15	375	396	40.4		54	188
3.20	363	383	39.1		52	182
3.25	352	372	37.9	(110.0)	51	176
3.30	341	360	36.6	(109.0)	50	170
3.35	331	350	35.5	(108.5)	48	166
3.40	321	339	34.3	(108.0)	47	160
3.45	311	328	33.1	(107.5)	46	155
3.50	302	319	32.1	(107.0)	45	150
3.55	293	309	30.9	(106.0)	43	145
3.60	285	301	29.9	(105.5)		141
3.65	277	292	28.8	(104.5)	41	137
3.70	269	284	27.6	(104.0)	40	133
3.75	262	276	26.6	(103.0)	39	129
3.80	255	269	25.4	(102.0)	38	126
3.85	248	261	24.2	(101.0)	37	122
3.90	241	253	22.8	100.0	36	118
3.95	235	247	21.7	99.0	35	115
4.00	229	241	20.5	98.2	34	111
4.05	223	234	(18.8)	97.3		
4.10	217	228	(17.5)	96.4	33	105
4.15	212	222	(16.0)	95.5		102
4.20	207	218	(15.2)	94.6	32	100
4.25	201	212	(13.8)	93.8	31	98
4.30	197	207	(12.7)	92.8	30	95
4.35	192	202	(11.5)	91.9	29	93
4.40	187	196	(10.0)	90.7		90
4.45	183	192	(9.0)	90.0	28	89
4.50	179	188	(8.0)	89.0	27	87
4.55	174	182	(6.4)	87.8		85
4.60	170	178	(5.4)	86.8	26	83
4.65	167	175	(4.4)	86.0		81
4.70	163	171	(3.3)	85.0	25	79
4.80	156	163	(0.9)	82.9		76
4.90	149	156		80.8	23	73
5.00	143	150		78.7	22	71
5.10	137	143		76.4	21	67
5.20	131	137		74.0		65
5.30	126	132		72.0	20	63
5.40	121	127		69.8	19	60
5.50	116	122		67.6	18	58
5.60	111	117		65.7	15	56

STEEL STRIP & COILED SHEET, STEEL SHEETS, SHIM STEEL, EXPANDED METAL

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Steel
Sheets,
Strip,
Expanded
Metal

SHIM STEEL**No. 1 SPRING TEMPER COLD ROLLED — BRIGHT FINISH**

Stocked in Coils

Thickness Dec. In.	Width Inches	No. Feet per Lb.	Approx. Wt. Lbs. per Lin. Ft.	Thickness Dec. In.	Width Inches	No. Feet per Lb.	Approx. Wt. Lbs. per Lin. Ft.
.001	6	49.00	.0204	.008	6	6.27	1632
.002	6	24.51	.0408	.009	6	5.23	1836
.003	6	16.34	.0612	.010	6	4.90	2040
.004	6	12.26	.0816	.012	6	4.08	2450
.005	6	9.80	.1020	.015	6	3.27	3060
.006	6	8.17	.1224	.020	6	2.45	4080
.007	6	6.97	.1428	.030	6	1.63	6120

Packaged 6 Inches Wide x 100 Inches Long

No.	Thickness	No.	Thickness
A-1	.001	A-9	.009
A-1X	.0015	A-10	.010
A-2	.002	A-12	.012
A-2X	.0025	A-13X	.0135
A-3	.003	A-15	.015
A-3X	.0035	A-16X	.0165
A-4	.004	A-18	.018
A-5	.005	A-20	.020
A-6	.006	A-22	.022
A-7	.007	A-25	.025
A-8	.008	A-31	.031

TYPE 302 FULL-HARD STAINLESS SHIM STEEL

Packaged 6 Inches Wide x 50 Inches Long

L-1	.001	L-10	.010
L-2	.002	L-12	.012
L-3	.003	L-15	.015
L-5	.005	L-20	.020
L-6	.006	L-25	.025
L-8	.008	L-31	.031



Steel Strip and Sheet Coils

STEEL STRIP AND SHEET COILS

48 Inch Maximum Width Coils

We can slit coils to width, cut to length and roller level according to customer requirements.

Thickness Gage	Dec. In.	Width Inches	Tolerance + or - Dec. In.	Thickness Gage	Dec. In.	Width Inches	Tolerance + or - Dec. In.
-------------------	-------------	-----------------	---------------------------------	-------------------	-------------	-----------------	---------------------------------

Lustre Finish Cold Rolled Strip

26.....	.0179.....	16 $\frac{3}{8}$.....	.0015	20.....	.0359.....	16 $\frac{3}{8}$.....	.002
24.....	.0239.....	16 $\frac{3}{8}$.....	.002	18.....	.0478.....	16 $\frac{3}{8}$.....	.003
22.....	.0299.....	16 $\frac{3}{8}$.....	.002	16.....	.0598.....	16 $\frac{3}{8}$.....	.0035

Commercial Quality Steel

28.....	.0149.....	36.....	.002	20.....	.0359.....	36.....	.0035
26.....	.0179.....	36.....	.002	20.....	.0359.....	25.....	.003
26.....	.0179.....	25.....	.002	18.....	.0478.....	48.....	.004
24.....	.0239.....	36.....	.003	18.....	.0478.....	36.....	.004
24.....	.0239.....	25.....	.003	18.....	.0478.....	25.....	.004
22.....	.0299.....	48.....	.003	17.....	.0538.....	36.....	.005
22.....	.0299.....	36.....	.003	16.....	.0598.....	48.....	.005
22.....	.0299.....	25.....	.003	16.....	.0598.....	36.....	.005
20.....	.0359.....	48.....	.0035	16.....	.0598.....	25.....	.005

Drawing Quality Steel

26.....	.0179.....	36.....	.002	20.....	.0359.....	36.....	.0035
24.....	.0239.....	36.....	.003	18.....	.0478.....	36.....	.004
22.....	.0299.....	36.....	.003	16.....	.0598.....	36.....	.005

Aluminum Killed — Drawing Quality Steel

24.....	.0239.....	36.....	.003	18.....	.0478.....	36.....	.004
22.....	.0299.....	36.....	.003	16.....	.0598.....	36.....	.005
20.....	.0359.....	36.....	.0035	.....	.....	.....	.....

Republic Electro Paintlok Steel

26.....	.0179.....	48.....	.002	18.....	.0500.....	48.....	.004
25.....	.0179.....	36.....	.002	18.....	.0500.....	36.....	.004

Galvanized Steel

28.....	.019.....	36.....	.003	22.....	.034.....	36.....	.004
28.....	.019.....	30.....	.003	22.....	.034.....	30.....	.004
26.....	.022.....	48.....	.003	20.....	.040.....	48.....	.005
26.....	.022.....	36.....	.003	20.....	.040.....	36.....	.005
26.....	.022.....	30.....	.003	20.....	.040.....	30.....	.005
24.....	.028.....	48.....	.004	18.....	.052.....	48.....	.006
24.....	.028.....	36.....	.004	18.....	.052.....	36.....	.006
24.....	.028.....	30.....	.004	18.....	.052.....	30.....	.006
22.....	.034.....	48.....	.004	16.....	.064.....	30.....	.007

WIDTH SLITTING TOLERANCES

Width, Inches	Thickness, Dec. Inch	
	.010 to .032 Incl.	.032 to .060 Incl. + or -
Including 2 In. or Narrower.....	.005.....	.010.....
Over 2 In. including 8 Inches.....	.008.....	.013.....
Over 8 In. including 14 Inches.....	.010.....	.015.....
Over 14 Inches including 48 In.....	.013.....	.018.....

COLD ROLLED STEEL SHEETS**Spec. QQ-S-636 and AISI-C1010 C/R****BRIGHT FINISH, OILED****COMMERCIAL QUALITY — CONDITION 4****DRAWING QUALITY — CONDITION 5**

Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet	Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet
28 (.0149)	.36x120	.625 .18.75	18 (.0478)	.36x120	.200 .60.00
26 (.0179)	.30x96	.749 .14.98		.48x96	.200 .64.00
	.30x120	.749 .18.73		.48x120	.200 .80.00
	.36x96	.749 .17.98		.60x120	.200 .100.00
	.36x120	.749 .22.47	16 (.0598)	.30x120	.250 .62.50
24 (.0239)	.30x120	1.00 .25.00		.36x96	.250 .60.00
	.36x96	1.00 .24.00		.36x120	.250 .75.00
	.36x120	1.00 .30.00		.36x144	.250 .90.00
	.48x96	1.00 .32.00		.48x96	.250 .80.00
	.48x120	1.00 .40.00		.48x120	.250 .100.00
	.48x144	1.00 .48.00		.48x144	.250 .120.00
22 (.0299)	.30x120	1.25 .31.25		.60x120	.250 .125.00
	.36x96	1.25 .30.00	14 (.0749)	.30x120	.3132 .78.30
	.36x120	1.25 .37.50		.36x96	.3132 .75.17
	.36x144	1.25 .45.00		.36x120	.3132 .93.75
	.48x96	1.25 .40.00		.48x84	.3132 .87.70
	.48x120	1.25 .50.00		.48x96	.3132 .100.22
	.48x144	1.25 .60.00		.48x120	.3132 .125.28
20 (.0359)	.30x120	1.501 .37.53		.48x144	.3132 .150.34
	.36x96	1.501 .36.02		.60x120	.3132 .156.60
	.36x120	1.501 .45.03	13 (.0897)	.36x120	.3750 .112.50
	.36x144	1.501 .54.04		.48x120	.3750 .150.00
	.48x96	1.501 .48.03	12 (.1046)	.36x120	.4374 .131.25
	.48x120	1.501 .60.04		.48x120	.4374 .174.96
	.48x144	1.501 .72.05	11 (.1196)	.36x120	.5002 .150.00
	.60x120	1.501 .75.05		.48x120	.5002 .200.08
19 (.0418)	.36x120	1.750 .52.50	10 (.1345)	.36x96	.5625 .135.00
18 (.0478)	.30x120	2.00 .50.00		.36x120	.5625 .168.75
	.36x96	2.00 .48.00		.48x120	.5625 .225.00

**THICKNESS TOLERANCES ON COLD ROLLED
STEEL COILS AND CUT LENGTHS**

Variations from Specified Thickness for Widths and Thicknesses Given—Over or Under, inch.

Width, Inches	.1419	.0971	.0821	.0709	.0567	.0508	.0388	.0313	.0254	.0194
	.0972	.0822	.0710	.0568	.0509	.0389	.0314	.0255	.0195	.0142
Over 20 to 24, incl.	.007	.006	.005	.005	.005	.004	.003	.003	.003	.002
Over 24 to 32, incl.	.008	.006	.006	.005	.005	.004	.003	.003	.003	.002
Over 32 to 40, incl.	.009	.007	.006	.005	.005	.004	.0035	.003	.003	.002
Over 40 to 48, incl.	.009	.007	.006	.005	.005	.004	.0035	.003	.003	.002
Over 48 to 60, incl.	.010	.008	.007	.006	.005	.004	.0035	.0035	.003	.002

Note: Coil stock slit in our warehouse will take the tolerance of the width from which it is slit.

THICKNESS TOLERANCES ON HOT ROLLED STEEL SHEETS

Gage	Width Inches	Tolerance Dec. Inch
10, 11, 12.....	36	+. or -.009
10, 11, 12.....	48 & 60 inc.	+. or -.010
10, 11, 12.....	72	+. or -.012
14.....	36 & 60 inc.	+. or -.007
14.....	Over 60 thru 72 inc.	+. or -.008
16.....	36 thru 48 inc.	+. or -.006
16.....	60	+. or -.007
18.....	36 thru 60 inc.	+. or -.005

HOT ROLLED STEEL SHEETS

Spec. QQ-S-636 Grade 1010

LOW CARBON (.08 TO .13) — COMMERCIAL QUALITY

Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet	Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet
18 (.0478)	30x96 .. 2.00 ..	40.00	12 (.1046)	72x120 .. 4.375 ..	262.50
	30x120 .. 2.00 ..	50.00		72x144 .. 4.375 ..	315.00
	36x96 .. 2.00 ..	48.00		72x240 .. 4.375 ..	525.00
	36x120 .. 2.00 ..	60.00	11 (.1196)	30x120 .. 5.0 ..	125.00
	48x96 .. 2.00 ..	64.00		30x144 .. 5.0 ..	150.00
	48x120 .. 2.00 ..	80.00		36x96 .. 5.0 ..	120.00
	48x144 .. 2.00 ..	96.00		36x120 .. 5.0 ..	150.00
16 (.0598)	30x96 .. 2.50 ..	50.00		36x144 .. 5.0 ..	180.00
	30x120 .. 2.50 ..	62.50		48x96 .. 5.0 ..	160.00
	30x144 .. 2.50 ..	75.00		48x120 .. 5.0 ..	200.00
	36x96 .. 2.50 ..	60.00		48x144 .. 5.0 ..	240.00
	36x120 .. 2.50 ..	75.00		60x120 .. 5.0 ..	250.00
	36x144 .. 2.50 ..	90.00		60x144 .. 5.0 ..	300.00
	48x96 .. 2.50 ..	80.00		72x120 .. 5.0 ..	300.00
	48x120 .. 2.50 ..	100.00		72x144 .. 5.0 ..	360.00
	48x144 .. 2.50 ..	120.00		72x240 .. 5.0 ..	600.00
	60x120 .. 2.50 ..	125.00	10 (.1345)	30x120 .. 5.625 ..	140.63
	60x144 .. 2.50 ..	150.00		30x144 .. 5.625 ..	168.75
14 (.0747)	30x120 .. 3.124 ..	78.13		36x96 .. 5.625 ..	135.00
	30x144 .. 3.124 ..	93.75		36x120 .. 5.625 ..	168.75
	36x96 .. 3.124 ..	75.00		36x144 .. 5.625 ..	202.50
	36x120 .. 3.124 ..	93.75		48x96 .. 5.625 ..	180.00
	36x144 .. 3.124 ..	112.50		48x120 .. 5.625 ..	225.00
	48x96 .. 3.124 ..	100.00		48x144 .. 5.625 ..	270.00
	48x120 .. 3.124 ..	125.00		60x120 .. 5.625 ..	281.25
	48x144 .. 3.124 ..	150.00		60x144 .. 5.625 ..	337.50
	60x120 .. 3.124 ..	156.25		72x120 .. 5.625 ..	337.50
	60x144 .. 3.124 ..	187.50		72x144 .. 5.625 ..	405.07
12 (.1046)	30x120 .. 4.375 ..	109.38		72x240 .. 5.625 ..	675.00
	30x144 .. 4.375 ..	131.25	8 (.1644)	36x96 .. 6.875 ..	165.00
	36x96 .. 4.375 ..	105.00		36x120 .. 6.875 ..	206.25
	36x120 .. 4.375 ..	131.25		36x144 .. 6.875 ..	247.50
	36x144 .. 4.375 ..	157.50	7 (.1793)	48x96 .. 7.50 ..	240.00
	48x96 .. 4.375 ..	140.00		48x120 .. 7.50 ..	300.00
	48x120 .. 4.375 ..	175.00		48x144 .. 7.50 ..	360.00
	48x144 .. 4.375 ..	210.00		72x120 .. 7.50 ..	450.00
	60x120 .. 4.375 ..	218.75		72x144 .. 7.50 ..	540.00
	60x144 .. 4.375 ..	262.50		72x240 .. 7.50 ..	900.00

Hot Rolled Sheets lighter than 18 gage have been discontinued by the mills. Refer to Cold Rolled Sheets.

LONG TERNE SHEETS

Standard Coating — Approx. 8 Pounds

Coating is an Alloy of Tin and Lead

End Uses: Automobile radiators, oil filters, building trim, flashing, conductor pipe, cutters, gasoline tanks and fireproof construction such as door and door casings, also radio chassis.

U.S. Gage	Width and Length Inches	Approx. Wt. Lbs. per Sheet	U.S. Gage	Width and Length Inches	Approx. Wt. Lbs. per Sheet
16	36x120	2.518 .. 75.54	22	36x120	1.268 .. 38.04
18	36x120	2.018 .. 60.54	24	36x120	1.018 .. 30.54
20	36x120	1.518 .. 45.54	26	36x120	.768 .. 23.04

HIGH STRENGTH HOT ROLLED STEEL SHEETS

N-A-XTRA-100 HIGH STRENGTH STEEL SHEETS

X-A-R ABRASION RESISTANT HOT ROLLED STEEL SHEETS

Refer to Pages 226-228

REPUBLIC ELECTRO PAINTLOK STEEL SHEETS**Bonderized for Painting**

Has zinc coating applied by an electro-plating process followed by special chemical treatment that produces sheets of dull light gray color without spangles that reduces tendency of coating to crack, flake, powder or peel during fabrication.

Typical uses include small buildings, office furniture, trailer bodies, lighting fixtures, etc.

Sheets are approximately 99, 123 or 147 inches long with gripper marks showing on each end. After removing gripper marks sheets will dress out to 8, 10 and 12 feet.

Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet	Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet
STRETCHER LEVELED, NOT RESQUARED					
24 (.0250)	.36x96	.1.046.. 25.10	20 (.0359)	.36x96	.1.501.. 36.02
	36x120	.1.046.. 31.38		36x120	.1.501.. 45.03
	48x96	.1.046.. 33.47		36x144	.1.501.. 54.04
	48x120	.1.046.. 41.84		48x96	.1.501.. 48.03
	48x144	.1.046.. 50.21		48x120	.1.501.. 60.04
22 (.0299)	.36x96	.1.250.. 30.00		48x144	.1.501.. 72.05
	36x120	.1.250.. 37.50	18 (.0500)	.36x120	.2.091.. 62.71
	36x144	.1.250.. 45.00		48x120	.2.091.. 83.64
	48x96	.1.250.. 40.00		48x144	.2.091.. 100.37
	48x120	.1.250.. 50.00		60x120	.2.091.. 104.55
	48x144	.1.250.. 60.00	16 (.0598)	.48x120	.2.500.. 100.00
20 (.0359)	.30x120	.1.501.. 37.53		48x144	.2.500.. 120.00

NOT STRETCHER LEVELED, NOT RESQUARED

26 (.0179)	.36x120	.749.. 22.47	22 (.0299)	.48x96	.1.25 .. 40.00
	48x120	.749.. 29.96		48x120	.1.25 .. 50.00
24 (.0239)	.36x96	.1.00 .. 24.00	20 (.0359)	.36x96	.1.501.. 36.02
	36x120	.1.00 .. 30.00		36x120	.1.501.. 45.03
	48x96	.1.00 .. 32.00		36x144	.1.501.. 54.04
	48x120	.1.00 .. 40.00		48x96	.1.501.. 48.03
22 (.0299)	.36x96	.1.25 .. 30.00		48x120	.1.501.. 60.04
	36x120	.1.25 .. 37.50		48x144	.1.501.. 72.05
	36x144	.1.25 .. 45.00			

ARMCO ZINCGRIP PAINTGRIP STEEL SHEETS**Bonderized for Painting**

Has specially-applied zinc coating that resists flaking or peeling during forming and drawing.

Dark-appearing sheet with spangles showing.

Provides good rust protection.

Sheets are approximately 123 and 147 inches long with gripper marks showing on each end. After removing gripper marks sheets will dress out to 10 and 12 feet.

STRETCHER LEVELED, NOT RESQUARED

Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet	Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sheet
26 (.0217)	.36x120	.906.. 27.19	18 (.0516)	.36x120	.2.156.. 64.69
24 (.0276)	.36x120	.1.156.. 34.69		36x144	.2.156.. 77.62
	48x120	.1.156.. 46.24		48x120	.2.156.. 86.24
22 (.0336)	.36x120	.1.406.. 42.18		48x144	.2.156.. 103.49
	48x120	.1.406.. 56.24	16 (.0635)	.36x144	.2.656.. 95.62
20 (.0396)	.36x120	.1.656.. 49.68		48x120	.2.656.. 106.24
	48x120	.1.656.. 66.24		48x144	.2.656.. 127.49
	48x144	.1.656.. 79.49			

We can re-square any of the above.

FLAT GALVANIZED STEEL SHEETS

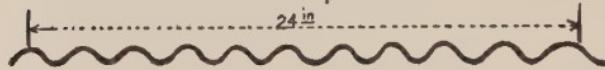
Spec. QQ-1-716 Class D1

Standard Coating 1.25 Ounces Per Square Foot

Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Gage & Dec. In.	Width and Lgth. Inches	Approx. Wt. Lbs. per Sq. Ft.
30 (.016)	24x96	.656.. 10.50	20 (.040)	48x144	1.656.. 79.49
	24x120	.656.. 13.12		60x120	1.656.. 82.80
	30x96	.656.. 13.12			
	30x120	.656.. 16.40	18 (.052)	24x96	.2156.. 34.50
	36x96	.656.. 15.74		24x120	.2156.. 43.12
	36x120	.656.. 19.68		24x144	.2156.. 51.74
28 (.019)	24x96	.781.. 12.50		30x96	.2156.. 43.12
	24x120	.781.. 15.62		30x120	.2156.. 53.90
	30x96	.781.. 15.62			
	30x120	.781.. 19.53	36x96	.2156.. 51.74	
	36x96	.781.. 18.74	36x120	.2156.. 64.68	
	36x120	.781.. 23.43	36x144	.2156.. 77.62	
26 (.022)	24x96	.906.. 14.50	48x96	.2156.. 68.99	
	24x120	.906.. 18.12	48x120	.2156.. 86.24	
	30x96	.906.. 18.12	48x144	.2156.. 103.49	
	30x120	.906.. 22.65	60x120	.2156.. 107.80	
			16 (.064)	24x96	.2656.. 42.50
				24x120	.2656.. 53.12
				24x144	.2656.. 63.74
	36x96	.906.. 21.74	30x96	.2656.. 53.12	
	36x120	.906.. 27.18	30x120	.2656.. 66.40	
	48x96	.906.. 28.99			
	48x120	.906.. 36.24	36x96	.2656.. 63.74	
24 (.028)	24x96	1.156.. 18.50	36x120	.2656.. 79.68	
	24x120	1.156.. 23.12	36x144	.2656.. 95.62	
	24x144	1.156.. 27.74	48x96	.2656.. 84.99	
	30x96	1.156.. 23.12	48x120	.2656.. 106.24	
	30x120	1.156.. 28.90	48x144	.2656.. 127.49	
			60x120	.2656.. 132.80	
	36x96	1.156.. 27.74	14 (.079)	24x96	.3281.. 52.50
	36x120	1.156.. 34.68		24x120	.3281.. 65.62
	36x144	1.156.. 41.62		24x144	.3281.. 78.74
	48x96	1.156.. 36.99	30x120	.3281.. 82.03	
	48x120	1.156.. 46.24	36x96	.3281.. 78.74	
	48x144	1.156.. 55.49			
22 (.034)	24x96	1.406.. 22.50	36x120	.3281.. 98.43	
	24x120	1.406.. 28.12	36x144	.3281.. 118.12	
	24x144	1.406.. 33.74	48x96	.3281.. 104.99	
	30x96	1.406.. 28.12	48x120	.3281.. 131.24	
	30x120	1.406.. 35.15	48x144	.3281.. 157.49	
			60x120	.3281.. 164.05	
	36x96	1.406.. 33.74	12 (.108)	24x96	.4531.. 72.50
	36x120	1.406.. 42.18		24x120	.4531.. 90.62
	36x144	1.406.. 50.62		24x144	.4531.. 108.74
	48x96	1.406.. 44.99	30x120	.4531.. 113.28	
	48x120	1.406.. 56.24			
	48x144	1.406.. 67.49	36x96	.4531.. 108.74	
20 (.040)	24x96	1.656.. 26.50	36x120	.4531.. 135.93	
	24x120	1.656.. 33.12	48x96	.4531.. 144.99	
	24x144	1.656.. 39.74	48x120	.4531.. 181.24	
	30x96	1.656.. 33.12	48x144	.4531.. 217.49	
	30x120	1.656.. 41.40			
			10 (.138)	24x120	.5781.. 115.62
				24x144	.5781.. 138.74
	36x96	1.656.. 39.74		36x120	.5781.. 173.43
	36x120	1.656.. 49.68		48x120	.5781.. 231.24
	36x144	1.656.. 59.62		48x144	.5781.. 277.49
	48x96	1.656.. 52.99			
	48x120	1.656.. 66.24			

CORRUGATED GALVANIZED STEEL SHEETS**Spec. ASTM-A-361 (Latest)**

Standard Coating 1.25 Ounces Per Square Foot

 $2\frac{1}{2}$ Inch Corrugations**ROOFING SHEETS — $27\frac{1}{2}$ INCHES WIDE****SIDING SHEETS — 26 INCHES WIDE**

Width and Length Inches	Approx. Wt. Lbs. per Sheet	No. of Sheets per Sq.	Width and Length Inches	Approx. Wt. Lbs. per Sheet	No. of Sheets per Sq.
----------------------------	-------------------------------	-----------------------	----------------------------	-------------------------------	-----------------------

No. 28 Gage

26x 60.....	9.10.....	9.231	26x108.....	16.38.....	5.128
72.....	10.92.....	7.692	120.....	18.20.....	4.616
84.....	12.74.....	6.593	144.....	21.84.....	3.846
96.....	14.56.....	5.769			

No. 26 Gage

26x 60.....	10.62.....	9.230	27 $\frac{1}{2}$ x 72.....	13.61.....	7.272
72.....	12.74.....	7.692	84.....	15.88.....	6.234
84.....	14.86.....	6.593	96.....	18.15.....	5.455
96.....	16.99.....	5.769	108.....	20.42.....	4.848
108.....	19.11.....	5.128	120.....	22.69.....	4.363
120.....	21.23.....	4.616	144.....	27.23.....	3.636
144.....	25.48.....	3.846			

No. 24 Gage

26x 60.....	13.54.....	9.231	27 $\frac{1}{2}$ x 72.....	17.32.....	7.272
72.....	16.25.....	7.692	84.....	20.21.....	6.234
84.....	18.96.....	6.593	96.....	23.10.....	5.455
96.....	21.67.....	5.769	108.....	25.99.....	4.849
108.....	24.38.....	5.128	120.....	28.87.....	4.363
120.....	27.08.....	4.616	144.....	34.65.....	3.636
144.....	32.50.....	3.846			

Square Feet in One Sheet **$2\frac{1}{2}$ Inch Corrugations**

Length Inches	26 In. Wide, No. Sq. Ft.	27 $\frac{1}{2}$ In. Wide, No. Sq. Ft.	Length Inches	26 In. Wide, No. Sq. Ft.	27 $\frac{1}{2}$ In. Wide, No. Sq. Ft.
60.....	10.833.....	11.458	108.....	19.500.....	20.625
72.....	13.000.....	13.750	120.....	21.667.....	22.917
84.....	15.167.....	16.042	132.....	23.833.....	25.208
96.....	17.333.....	18.333	144.....	26.000.....	27.500

Weight per square—28 ga. 84 lbs., 26 ga. 98 lbs., 24 ga. 125 lbs.

COVERING AREA—A square of corrugated roofing will not cover one square—(100 square feet) as the laps are not considered.

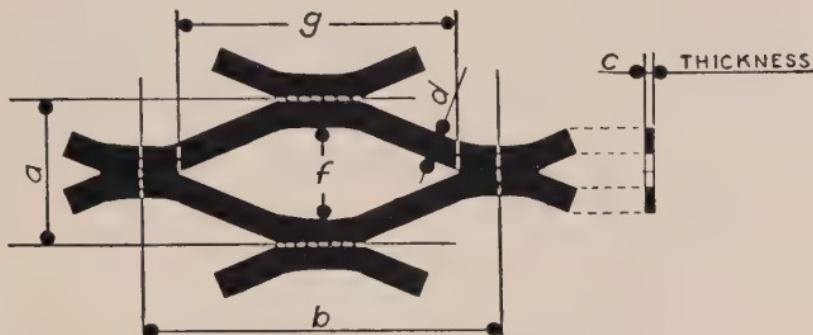
26 inch sheets—Full covering width, 24 inches when lapped one corrugation.

27 $\frac{1}{2}$ inch sheets—Full covering width, 24 inches when lapped one and one half corrugations.

On siding, a 1 inch or 2 inch end lap is sufficient, but on roofing it varies 3 to 6 inches according to pitch of roof.

The 2 $\frac{1}{2}$ inch corrugated sheets will lay 24 inches to weather, with a side lap of one corrugation.It requires about 165 nails (approx. 1 $\frac{1}{2}$ lbs.) and washers to lay one square of roofing.

FLATTENED EXPANDED METAL



Flattened Expanded Metal can be had in a variety of sizes, gages and types of metal. In addition to open hearth steel, it can be furnished in certain gages of brass, copper, Everdur, aluminum and stainless steel.

A rigid, easily fabricated, economical flat surfaced expanded steel sheet. It has many uses, limited only to the ingenuity of the designer. It is easily worked, can be bent in any direction without impairing its strength, and can be welded. It has the important advantage of a flat, smooth surface on which small objects may be slid without danger of tipping. Flattened Expanded Metal can be plated in standard finishes. For shelving as in refrigerators, ovens, drying racks, kiln shelves, etc., it allows maximum air passage.

Size In. and Style No.	Standard Sheet Size Width In.	Length In.	U.S. Std. Gauge Used	App. Wt. Lbs. 100 Sq. Ft.	Diamond Size Dec. In. $a \times b$	Opening Size Dec. In. $f \times g$	Strand Dec. In. $c \times d$
CARBON STEEL							
1/4-20	48	96	20	82	.25 x 1.018	.094 x .688	.029 x .086
1/4-18	48	96	18	108	.25 x 1.024	.094 x .688	.042 x .080
1/2-40	36, 48	96	18	38	.462 x 1.223	.345 x 1.00	.039 x .065
1/2-20	36, 48	96	20	40	.462 x 1.26	.340 x 1.00	.029 x .074
1/2-18	36, 48	96, 120	18	66	.462 x 1.26	.261 x 1.00	.039 x .095
1/2-16	36, 48	96, 120	16	80	.462 x 1.26	.250 x 1.00	.050 x .089
1/2-13	36, 48	96, 120	13	140	.462 x 1.245	.250 x 1.00	.070 x .111
3/4-16	36, 48	96, 120	16	110	.923 x 2.098	.750 x 1.781	.048 x .110
3/4-14	36, 48	96, 120	14	114	.923 x 2.111	.688 x 1.781	.061 x .114
3/4-13	36, 48	96, 120	13	76	.923 x 2.078	.688 x 1.781	.070 x .137
3/4-9†	36, 48	96, 120	10	171	.923 x 2.120	.562 x 1.680	.120 x .157
1 -16	48	96	16	106	1.00 x 2.508	.780 x 2.06	.048 x .106
1 1/2-16	36, 48	96	16	38	1.33 x 3.146	1.062 x 2.75	.048 x .127
1 1/2-16§	48	96	16	29	1.33 x 3.12	1.150 x 3.20	.048 x .090
1 1/2-14	36, 48	96, 120	14	46	1.33 x 3.105	1.062 x 2.75	.061 x .120
1 1/2-13	36, 48	96, 120	13	57	1.33 x 3.115	1.062 x 2.75	.070 x .130
1 1/2-9	36, 48	96, 120	10	114	1.33 x 3.207	1.000 x 2.562	.110 x .165

TYPE 304 STAINLESS STEEL

1/2-18	36, 48	96	18	69	.462 x 1.260	.252 x .970	.039 x .098
1/2-16	48	96	16	86	.462 x 1.260	.252 x .943	.051 x .097
3/4-18	48	96	18	46	.923 x 2.100	.673 x 1.783	.039 x .127
3/4-16	36, 48	96	16	57	.923 x 2.100	.683 x 1.763	.051 x .121
3/4-13	48	96	13	88	.923 x 2.100	.636 x 1.710	.079 x .125
1 1/2-16	36, 48	96	16	43	1.33 x 3.150	1.072 x 2.725	.051 x .132

ALLOY 3003-H14 ALUMINUM

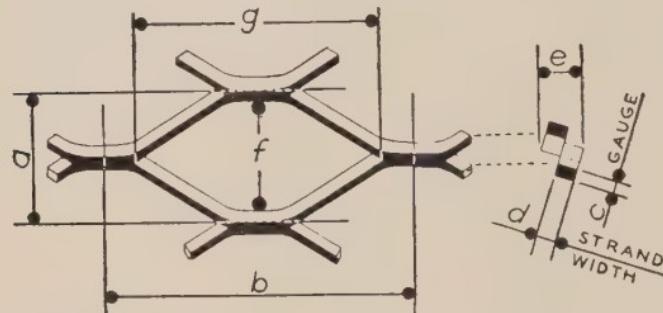
1/2-.051	36, 48	96	16	25	.46 x 1.26	.250 x 1.000	.045 x .097
1/2-.081	36, 48	96	12	41	.46 x 1.26	.250 x 1.000	.067 x .101
3/4-.051	48	96	16	16	.923 x 2.125	.750 x 1.781	.040 x .132
3/4-.081§	48	96	12	30	.923 x 2.125	.750 x 1.781	.070 x .141
3/4-.081*	48	96	12	38	.923 x 2.125	.688 x 1.781	.070 x .182
3/4-.125	48	96	8	61	.923 x 2.125	.600 x 1.750	.095 x .212
1 1/2-.081	48	96	12	20	1.33 x 3.125	1.062 x 2.750	.070 x .138
1 1/2-.125	48	96	8	40	1.33 x 3.125	1.000 x 2.750	.095 x .240

†Also 144 Inch Lengths.

§Light.

*Heavy.

RAISED EXPANDED METAL



Expanded Metal is a continuous fabric of uniformly shaped diamond meshes, cut and expanded from sheet stock, and made in a variety of gauges and sizes. The meshes are free from mechanical joints and are easily cleaned. When used for window guards, partitions for stockrooms, workrooms, toolrooms, lockers, etc., they furnish security against theft, also freely admit light and air.

Size In. and Style No.	Standard Sheet Size Width In.	Standard Lgth. In.	U.S. Std. Steel Used	Wt. Lbs. 100 Sq. Ft.	Diamond Size Dec. In. a x b	Opening Size Dec. In. f x g	Overall Thick- ness Dec. In. e	Strand Dec. In. c x d
CARBON STEEL								
1/4-20	48	96	20	86	.25 x 1.0	.167 x .747	.125	.036x.073
1/4-18	48	96	18	114	.25 x 1.0	.155 x .703	.125	.048x.073
1/2-20	48	96	20	43	.462 x 1.2	.400 x .968	.134	.036x.066
1/2-18	48, 72	96	18	70	.462 x 1.2	.392 x .920	.161	.048x.081
1/2-16	48, 72	96	16	84	.462 x 1.2	.375 x .906	.159	.060x.078
	48	120	16	84	.462 x 1.2	.375 x .906	.159	.060x.078
1/2-13	48, 72	96	13	147	.462 x 1.2	.335 x .826	.199	.090x.091
3/4-16	48, 72	96	16	50	.923 x 2.0	.844 x 1.692	.183	.060x.092
	48	120	16	50	.923 x 2.0	.844 x 1.692	.183	.060x.092
3/4-13	48, 72	96	13	80	.923 x 2.0	.812 x 1.635	.185	.090x.098
3/4-10	48, 72	96	13	120	.923 x 2.0	.786 x 1.592	.277	.090x.148
3/4-9	48, 72	96	10	180	.923 x 2.0	.740 x 1.514	.290	.134x.148
	48	120, 144	10	180	.923 x 2.0	.740 x 1.514	.290	.134x.148
1 -16	48	96	16	44	1.00 x 2.4	.924 x 1.948	.196	.060x.089
1 1/2-16	48	96	16	40	1.33 x 3.0	1.253 x 2.608	.210	.060x.107
1 1/2-13	48	96, 120	13	60	1.33 x 3.0	1.223 x 2.548	.213	.090x.107
	60	120	13	60	1.33 x 3.0	1.223 x 2.548	.213	.090x.107
	72	96, 120	13	60	1.33 x 3.0	1.223 x 2.548	.213	.090x.107
1 1/2-10	48	96, 120	13	79	1.33 x 3.0	1.210 x 2.530	.248	.090x.140
	72	96, 120	13	79	1.33 x 3.0	1.210 x 2.530	.248	.090x.140
1 1/2-9	48	96, 120	10	120	1.33 x 3.0	1.165 x 2.446	.289	.134x.143
	72	96, 120	10	120	1.33 x 3.0	1.165 x 2.446	.289	.134x.143
1 1/2-6	72	144	6	250	1.33 x 3.0	1.060 x 2.250	.385	.198x.203

TYPE 304 STAINLESS STEEL

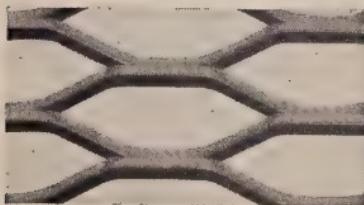
1/2-18	48	96	18	73	.462 x 1.2	.383 x .923	.154	.050x.080
1/2-16	48	96	16	91	.462 x 1.2	.371 x .899	.161	.062x.080
3/4-18	48	96	18	48	.923 x 2.0	.849 x 1.698	.176	.050x.106
3/4-16	48	96	16	60	.923 x 2.0	.837 x 1.680	.178	.062x.106
1 1/2-16	48	96	16	45	1.33 x 3.0	1.249 x 2.596	.296	.062x.114

ALLOY 3003-H14 ALUMINUM

1/2-.051	48	96	16	27	.462 x 1.2	.377 x .911	.152	.051x.087
1/2-.081	48	96	12	44	.462 x 1.2	.346 x .849	.178	.081x.088
3/4-.051	48	96	16	17	.923 x 2.0	.846 x 1.694	.192	.051x.109
3/4-.081†	48	96	12	32	.923 x 2.0	.806 x 1.626	.211	.081x.128
3/4-.081§	48	96	12	41	.923 x 2.0	.781 x 1.581	.270	.081x.165
3/4-.125	48	96	8	65	.923 x 2.0	.733 x 1.501	.292	.125x.170
1 1/2-.125	48	96	8	43	1.33 x 2.0	1.165 x 2.442	.269	.125x.163

†Light. §Heavy.

EXPANDED METAL GRATING



Suitable for walkways or catwalk grating. Each length cold drawn from a single sheet of metal, without joints or welds. Truss design eliminates lateral distortion. It is lightweight, self-cleaning, and assures safe footing.

Compared with usual designs this expanded metal grating has an exceptionally long bond which increases the contact area as much as 5 fold thus providing a much smoother walking and tracking surface.

Furnished in black finish, but can be painted or plated.

Flattened Grate-X can be supplied from mill on special order.

Note: Sold in full sheets only. Cut to specification on request. When ordering specify by giving dimensions S.W.D. x L.W.D.

Size No. & Approx.	Standard Sheet, Inches S.W.D. Wt. Lbs. Sq. Ft.	Diamond Size (Short Way of Diamond)	Diamond Openings Width x Lgth. Dec. Inch	Strand Size Width x Lgth. Dec. Inch	Strand Size Thick x Width Dec. Inch
-----------------------	---	--	---	--	--

CARBON STEEL

3.0 Lb.	72	96	1.333x5.33	1.041x3.732	.183x.264
	72	120	1.333x5.33	1.041x3.732	.183x.264
	72	150	1.333x5.33	1.041x3.732	.183x.264
3.14 Lb.	48	72	2.00 x6.00	1.041x3.732	.183x.264
	48	120	2.00 x6.00	1.041x3.732	.183x.264
4.0 Lb.	48	96	1.333x5.33	.975x3.594	.215x.300
	48	120	1.333x5.33	.975x3.594	.215x.300
	60	96	1.333x5.33	.975x3.594	.215x.300
	60	120	1.333x5.33	.975x3.594	.215x.300
	72	96	1.333x5.33	.975x3.594	.215x.300
	72	120	1.333x5.33	.975x3.594	.215x.300
4.27 Lb.	48	72	1.412x4.00	1.036x2.969	.243x.300
	48	96	1.412x4.00	1.036x2.969	.243x.300
5.0 Lb.	48	96	1.333x5.33	.950x3.40	.215x.300
	48	120	1.333x5.33	.950x3.40	.215x.300
	60	96	1.333x5.33	.950x3.40	.215x.300
6.25 Lb.	48	96	1.412x5.33	.915x3.460	.312x.350
	48	144	1.412x5.33	.915x3.460	.312x.350
	72	96	1.412x5.33	.915x3.460	.312x.350
	72	144	1.412x5.33	.915x3.460	.312x.350

ALLOY 5052-H32 ALUMINUM

2.0 Lb.	60	96	1.412x5.33	.914x3.260	.250x.400
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LOAD TEST DATA FOR CARBON STEEL

EXPANDED METAL GRATING

LOADING CONDITION

Concentrated load in lbs. per 12" of width applied at center of span. Deflections given in inches at center span are based on tests. Ends of grating rigidly fastened to supports about 6" on centers.

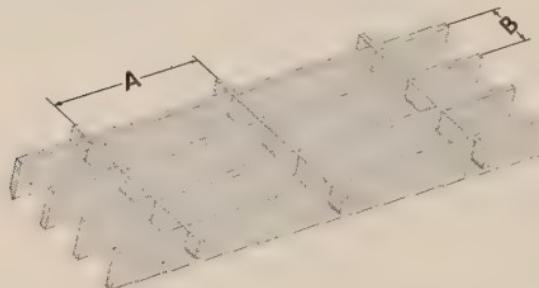
TABLE OF DEFLECTIONS

Load Lbs.	25" Clear Span			30" Clear Span			35" Clear Span			40" Clear Span		
	5#	4#	3#	5#	4#	3#	5#	4#	3#	5#	4#	3#
50	.022	.032	.049	.034	.056	.063	.059	.083	...	.077	.130	...
100	.045	.062	.098	.073	.107	.125	.118	.170	...	.155	.260	...
150	.067	.090	.148	.112	.156	.188	.180	.257	...	.236	.391	...
200	.090	.120	.197	.154	.208	.250	.244	.338	...	.324	.520	...

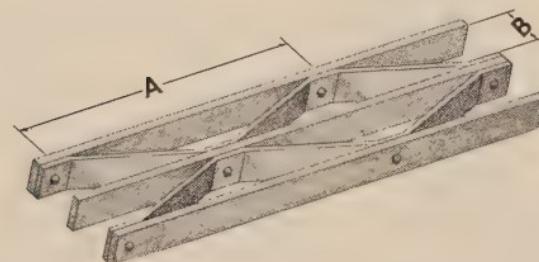
STEEL GRATINGS**MECHANICAL LOCK — RIVETED — WELDED**

Complete line of standard open metal gratings and grids for all uses, also specially designed gratings of aluminum and stainless steel alloys.

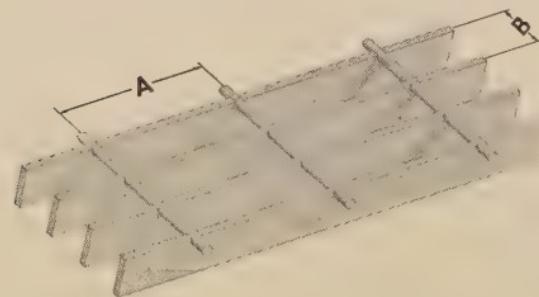
High-strength, low alloy steels are also available for strong but light-weight gratings and deckings.

**MECHANICAL LOCK****Types**

	Typical Dimensions Inches	
	A	B
Standard space pattern.....	4	1 1/16
Close spacing between bearing bars.....	4	1 5/16
Wide spacing between bearing bars.....	4	1 5/8
Narrow spacing between cross bars.....	2	1 1/16
Close spacing between bearing bars and narrow spacing between cross bars.....	2	1 5/16

**RIVETED****Types**

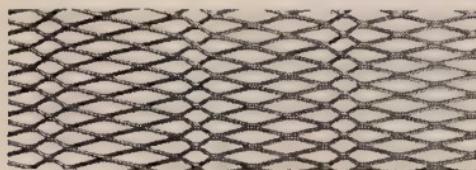
	Typical Dimensions Inches	
	A	B
Standard space pattern.....	7	1
Close spacing between bearing bars.....	7	1 1/16
Wide spacing between bearing bars.....	7	1 1/2
Narrow spacing between rivets.....	3 1/2	1
Close spacing between bearing bars and narrow spacing between rivets.....	3 1/2	1 1/16

**WELDED****Types**

	Typical Dimensions Inches	
	A	B
Standard space pattern.....	4	1 1/16
Close spacing between bearing bars.....	4	.915
Wide spacing between bearing bars.....	4	1.83
Narrow spacing between cross bars.....	2	1 1/16
Close spacing between bearing bars and narrow spacing between cross bars.....	2	.915

Illustrated Catalogs showing Load Tables, Dimensions, Weights and Construction Details; also Engineering Assistance are available upon request.

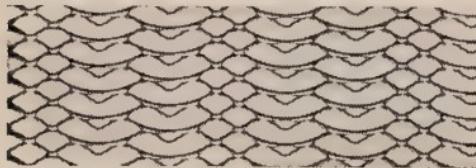
MULTIMESH DECORATIVE EXPANDED METAL



Crystal

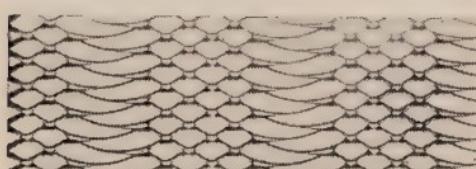
Used for decoration or display, architecturally, or as an integral part of an appliance or machine.

Sizes and weights of standard items are listed below.



Pendant

Other gages in steel and aluminum, as well as other metals, such as Monel, copper and brass, are available on Special Order.



Garland

U.S. Standard Gage used for carbon steel. B&S Gage used for aluminum.

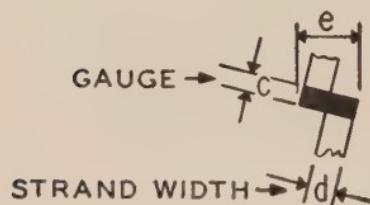
Sheet Size: Width 24 Inches; Length, 48 Inches.

Style Number	Strand		Center to Center of Bridges			No. of Diamonds per Ft.	Approx. % Open Area
	Decimal Ins. Width	Thick	SWD	LWD	LWD		
CARBON STEEL							
Crystal							
A-3422	.034	.030	.1667	.600	.450	.300	.72.....60
A-3424	.034	.024	.1667	.600	.450	.300	.72.....60
A-3426	.034	.018	.1667	.600	.450	.300	.72.....60
A-4022	.040	.030	.1690	.600	.450	.300	.71.....57
A-4024	.040	.024	.1690	.600	.450	.300	.71.....57
A-4026	.040	.018	.1690	.600	.450	.300	.71.....57
A-6022	.060	.030	.1779	.600	.450	.300	.68.....32
A-6024	.060	.024	.1779	.600	.450	.300	.68.....32
A-6026	.060	.018	.1779	.600	.450	.300	.68.....32
Pendant							
B-3422	.034	.030	.2000	.750	.375	.....60	.....69
B-3424	.034	.024	.2000	.750	.375	.....60	.....69
B-3426	.034	.018	.2000	.750	.375	.....60	.....69
B-5022	.050	.030	.2100	.750	.375	.....56	.....53
B-5024	.050	.024	.2100	.750	.375	.....56	.....53
B-5026	.050	.018	.2100	.750	.375	.....56	.....53
Garland							
C-3422	.034	.030	.2000	.750	.375	.....60	.....69
C-3424	.034	.024	.2000	.750	.375	.....60	.....69
C-3426	.034	.018	.2000	.750	.375	.....60	.....69
C-5022	.050	.030	.2100	.750	.375	.....56	.....53
C-5024	.050	.024	.2100	.750	.375	.....56	.....53
C-5026	.050	.018	.2100	.750	.375	.....56	.....53

ALUMINUM

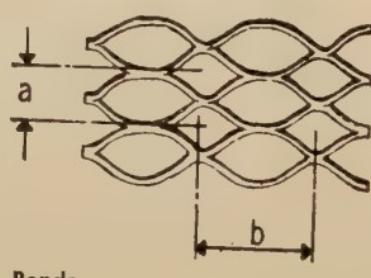
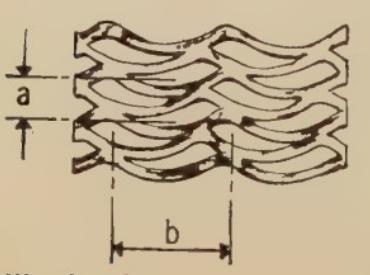
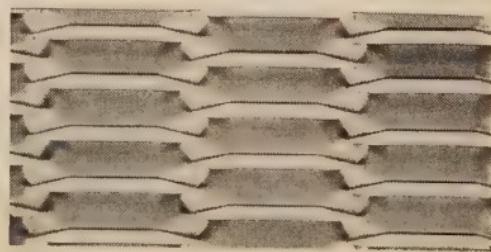
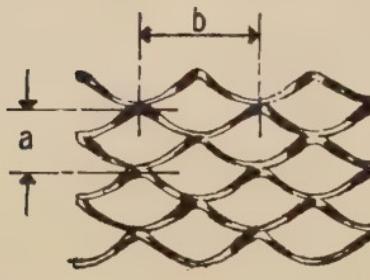
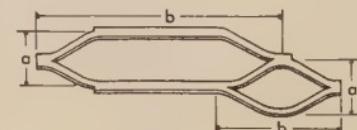
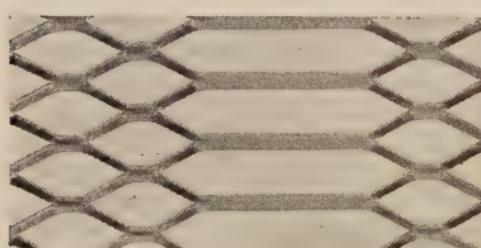
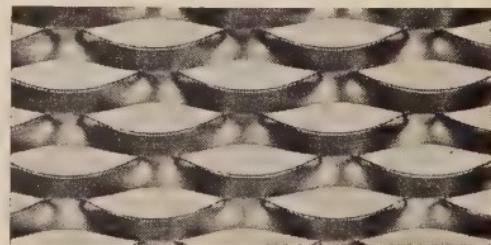
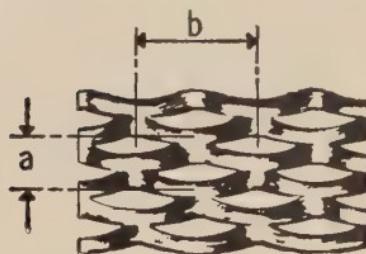
Crystal							
A-34032	.034	.032	.1667	.600	.450	.300	.72.....60
A-40032	.040	.032	.1690	.600	.450	.300	.71.....57
A-60032	.060	.032	.1779	.600	.450	.300	.68.....32
Pendant							
B-34032	.034	.032	.2000	.750	.375	.....60	.....69
B-50032	.050	.032	.2100	.750	.375	.....56	.....53
Garland							
C-34032	.034	.032	.2000	.750	.375	.....60	.....69
C-50032	.050	.032	.2100	.750	.375	.....56	.....53

DECORATIVE EXPANDED METALS



Architects and designers find these versatile new meshes ideal for design of screens, room dividers, shelves, ornamental trims, grilles, ceilings, partitions and many exterior architectural applications including sun-shades. In industrial applications, protection, utility and improved appearance are realistic needs these metals serve. Available in carbon steel, aluminum and, in some meshes, stainless steel.

NOTE: All styles of decorative metals also available in $\frac{1}{2}$ -inch #20 (20 Gage Steel).



DECORATIVE EXPANDED METALS (Cont.)

Sheet Sizes: Type R: 4 foot short way opening x 8 foot long way opening.
 Type F: 8 foot short way opening x 4 foot long way opening.

Style Designation	Wt. Lbs. Per 100 Sq. Ft.	Design Size a x b Inches	Opening Size Width x Lgth. Inches	Strand Size C x d Inches	Overall Thick. e Inches	Per Cent Open Area
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TYPE R (RAISED) CARBON STEEL

Armorweave

1/2"-#16	166	.60x1.20	.375 x .938	.060x.200	.219	34
1/2"-#18	133	.60x1.20	.375 x .938	.048x.200	.219	34
1 1/2"-#16	183	1.38x3.00	.750 x2.313	.060x.500	.625	27
1 1/2"-#18	146	1.38x3.00	.750 x2.375	.048x.500	.563	27
1 1/2"-#16 (H)	225	1.50x3.00	.5625x2.3125	.060x.675	.750	10
1 1/2"-#18 (H)	180	1.50x3.00	.625 x2.375	.048x.675	.625	10
1 1/2"-#20 (H)	135	1.50x3.00	.625 x2.375	.036x.675	.625	10

Crescent Wide Strand

1/2"-#20	100	.60x1.20	.....	.036x.200	....	34
1/2"-#18	133	.60x1.20	.....	.048x.200	....	34
1/2"-#16	166	.60x1.20	.....	.060x.200	....	34
1 1/2"-#20	113	1.31x3.00	.....	.036x.500	....	25
1 1/2"-#18	146	1.38x3.00	.....	.048x.500	....	27
1 1/2"-#16	183	1.38x3.00	.....	.060x.500	....	27

Cathedral

1/2"-#16	97	.458x1.0 & 2.0	.344x.75 & 1.75	.060x.089	.175	61
1/2"-#18	77	.458x1.0 & 2.0	.344x.75 & 1.75	.048x.089	.175	61
1/2"-#20	58	.458x1.0 & 2.0	.344x.75 & 1.75	.036x.089	.175	61

Cascade

1" —#13	75	1.00x1.625 & 3.250	.....	.090x.100	....	67
1" —#10	158	1.00x1.625 & 3.250	.....	.134x.140	....	67

Festoon

1/2"-#16	72	.625x1.20	.500x .938	.060x.090	.175	71
1/2"-#18	58	.625x1.20	.500x .938	.048x.090	.175	71

Louvremesh

#18	178	.80 x5.33	.....	.048x.356	....	10
#16	222	.80 x5.33	.....	.060x.356	....	10
#13	334	.80 x5.33	.....	.090x.356	....	10

Rondo

1/2"-#16	86	.520x1.195	.438x .938	.060x.089	.163	65
1/2"-#18	71	.520x1.195	.438x .938	.048x.089	.163	65

Wavelength

1/2"-#16	92	.555x1.20	.438x .938	.060x.103	.171	63
1/2"-#18	74	.555x1.20	.438x .938	.048x.103	.171	63

TYPE F (FLATTENED) CARBON STEEL

Festoon	65	.688x1.20	.540x1.00	.051x.100	.051	64
1/2"-#18	52	.688x1.20	.500x1.00	.040x.100	.040	64

Rondo

1/2"-#16	78	.625x1.195	.469x .938	.051x.100	.051	59
1/2"-#18	64	.625x1.195	.438x .938	.040x.100	.040	59

Wavelength

1/2"-#16	83	.625x .120	.375x .938	.051x.112	.051	57
1/2"-#18	67	.625x .120	.375x .938	.040x.112	.040	57

TYPE R (RAISED) ALUMINUM

Armorweave	48	.60 x1.20	.375 x .938	.051x .200	.219	34
1 1/2"-#.051	55	1.313x3.00	.563 x2.125	.051x .500	.500	25
1 1/2"-#.081	87	1.313x3.00	.563 x2.125	.081x .500	.563	25
1 1/2"-#.051 (H)	65	1.50 x3.00	.625 x2.125	.051x .675	.625	10
1 1/2"-#.081 (H)	104	1.50 x3.00	.4375x2.125	.081x .675	.750	10
4"-#.081 (H)	96	3.00 x8.00	1.25 x6.00	.081x1.25	1.187	20

Cascade

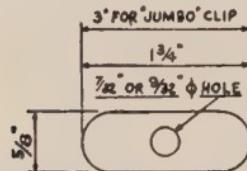
1" —#.081	21	1.00x1.625 & 3.250	.....	.081x.090	....	67
1" —#.125	46	1.00x1.625 & 3.250	.....	.125x.130	....	67

Crescent Wide Strand

1/2"-#.051	48	.60 x1.20	.....	.051x.200	....	34
1/2"-#.081	77	.60 x1.20	.....	.081x.200	....	34
1 1/2"-#.051	59	1.27 x3.00	.....	.051x.500	....	21
1 1/2"-#.081	89	1.297x3.00	.....	.081x.500	....	23

Louvremesh

.051	64	.80 x5.33	.....	.051x.356	....	10
.081	101	.80 x5.33	.....	.081x.356	....	10

ACCESSORIES FOR EXPANDED CARBON STEEL**ECONOMY CLIPS****ECONOMY CLIP
NO. 16 GA.**

A quick and economical method for securing Expanded Metal to angle iron, etc. They eliminate the need for continuous strips. Made in two sizes.

No. 1 (Standard) clips used with $\frac{1}{2}$ or $\frac{3}{4}$ inch meshes, measure $1\frac{3}{4} \times \frac{5}{8}$ inches. $\frac{9}{32}$ inch holes. Packed 500 to the bag.

No. 2 (Jumbo) clips, $3 \times \frac{5}{8}$ inches, are used with the $1\frac{1}{2}$ inch meshes, $\frac{9}{32}$ inch holes. Packed 150 to bag.

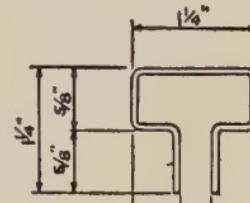
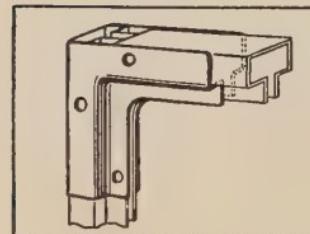
RIVETS

Rivets available in following sizes either black or galvanized: Round Head $\frac{3}{16} \times \frac{5}{8}$ -in. or $\frac{3}{16} \times \frac{7}{8}$ -in. Countersunk $\frac{3}{16} \times \frac{1}{2}$ -in. or $\frac{3}{16} \times 1\frac{3}{16}$ -in. Packed 1,000 rivets to the box.

Soft steel rivets supplied in two sizes— $\frac{3}{16} \times 1\frac{1}{16}$ -inches, packed 500 to the bag. $\frac{3}{16} \times \frac{3}{4}$ -inches, packed 1,000 to the bag.

PARTITION BARS**20 Foot Lengths**

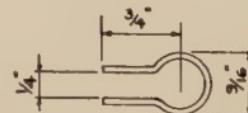
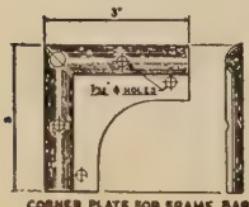
Makes possible rigid Expanded Metal panels. Accurate, straight and true. Made from No. 16 gage cold rolled steel. At cross section the bar is $1\frac{1}{4} \times 1\frac{1}{4}$ inches. Slightly oiled.

**PARTITION BAR
NO. 16 GA.****PARTITION CORNER PLATES**

Fit snugly over Partition Bar and form a neat, square, workmanlike panel. Pieces are 4×4 inches. Furnished with $\frac{9}{32}$ inch holes for attaching. Made from No. 16 gauge steel.

FRAME BARS**12 Foot Lengths**

For framing window guards, etc. Made from No. 18 gage cold rolled steel. Takes either $\frac{1}{2}$ or $\frac{3}{4}$ or $1\frac{1}{2}$ inch Expanded Metal. Bars are $\frac{1}{2}$ inch wide by 1 inch deep. Plain or galvanized.

**FRAME BAR
NO. 18 GA.****FRAME BAR CORNER PLATES**

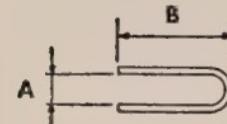
Made from No. 16 gage steel. Plain or galvanized. Pieces are 3×3 inches and have $\frac{9}{32}$ inch holes for riveting.

CORNER PLATE FOR FRAME BAR

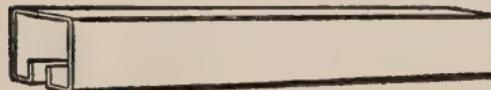
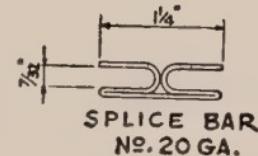
ACCESSORIES FOR EXPANDED CARBON STEEL (Cont.)**U-EDGE FRAMING METAL**

For use with flattened Expand-X.

Gage	Length Feet	A Inch	B Inch
16.....	16.....	.065.....	$\frac{3}{8}$
18.....	10.....	$\frac{1}{4}$	1

**SPLICING BARS****10 Foot Lengths**

For joining mesh to mesh, or mesh to sheet metal. Also used as a splice and reinforcing member to obtain greater rigidity in large panels. Mesh is secured by compressing flanges by hammering. No. 20 gage steel. $1\frac{1}{2}$ inches wide.

**No. 30-1/2 BOX TRACK****10 Foot Lengths**

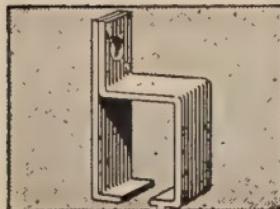
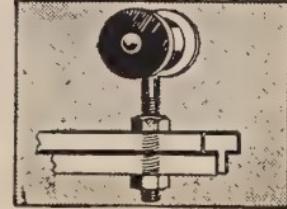
For sliding doors (either level or gravity) on open partitions. Can be erected on either Partition Bar or angle iron frames with brackets described below. Straight, true and rigid. Designed for use with No. 2 Hangers.

Painted grey. Weight, per foot $1\frac{1}{3}$ pounds. Width, $1\frac{3}{8}$ inches; Height, $1\frac{1}{8}$ inches; Thickness, 16 gage.

No. 2 TRACK HANGERS

For use with Box Track. Metal wheels on ball bearings. Diameter $1\frac{3}{4}$ inches. Distance end of pendant to bottom of track, about three inches. Vertical adjustment. Capacity 50# each.

Weight per pair, $1\frac{1}{8}$ pounds.

**No. 1 30 1/2 TRACK BRACKETS**

Designed specifically for use with the above Box Track. Can be erected on either Partition Bar or Angle Iron. Provides a sturdy support for tracks. Finished in Black Japan.

Weight, each, $\frac{3}{4}$ pound.

Additional sizes of Box Track, Track Hangers and Brackets are available on mill orders.

EXPANDED METAL INVENTORIES

Our inventories of Expanded Metal and Accessories are broad and complete. We can handle any requirement you may have on these products. Write or phone us your inquiries.

HOT ROLLED STEEL PLATES, STEEL FLOOR PLATES, BLANCHARD GRINDING

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FABRICATING PROBLEMS?

Ducommun metal fabricating specialists will welcome the opportunity to help you with inquiries and give you special service with plate and structural metal working problems.

HOT ROLLED STEEL PLATES

3/16 Thru 1 1/2 Inches Thick — Spec. ASTM-A-7

TYPICAL MECHANICAL PROPERTIES

Tensile Strength P.S.I.	Yield Point P.S.I.	*Elongation in 8 Inches	*Elongation in 2 Inches
60-72,000	33,000 Min.	21% Min.	24% Min.

*Plate under $\frac{5}{16}$ " thick and over $\frac{3}{4}$ " thick subject to a slight reduction.

Sizes $\frac{3}{16}$ to $\frac{3}{4}$ inch Shear Cut.

Sizes $\frac{1}{8}$ inch and heavier torch cut to any dimensions.

Thick- ness Inches	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.	Thick- ness Inches	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.
$\frac{3}{16}$	48 $\frac{1}{16}$	7.65	30.60	$\frac{5}{8}$	72	25.50	153.00
	60	7.65	38.25		84	25.50	178.50
	72	7.65	45.90		96	25.50	204.00
	84	7.65	53.55		120	25.50	255.00
	96	7.65	61.20	$\frac{1}{4}$	48	30.60	122.40
$\frac{1}{4}$	30	10.20	25.50		60	30.60	153.00
	36	10.20	30.60		72	30.60	183.60
	48	10.20	40.80		84	30.60	214.20
	60	10.20	51.00		96	30.60	244.80
	72	10.20	61.20	$\frac{3}{8}$	48	35.7	142.80
	84	10.20	71.40		60	35.7	178.50
	96	10.20	81.60		72	35.7	214.20
	120	10.20	102.00		84	35.7	249.90
$\frac{5}{16}$	36	12.75	38.25		96	35.7	285.60
	48	12.75	51.00	$\frac{1}{2}$	48	40.8	163.20
	60	12.75	63.75		60	40.8	204.00
	72	12.75	76.50		72	40.8	244.80
	84	12.75	89.25		84	40.8	285.60
	96	12.75	102.00		96	40.8	326.40
	120	12.75	127.50	$\frac{3}{4}$	48	45.9	183.60
$\frac{3}{8}$	36	15.30	45.90		60	45.9	229.50
	48	15.30	61.20		72	45.9	275.40
	60	15.30	76.50		84	45.9	321.30
	72	15.30	91.80		96	45.9	367.20
	84	15.30	107.10	$\frac{1}{16}$	48	51.0	204.00
	96	15.30	122.40		60	51.0	255.00
	120	15.30	153.00		72	51.0	306.00
$\frac{7}{16}$	96	17.85	142.80		84	51.0	357.00
$\frac{1}{2}$	48	20.40	81.60	$\frac{1}{16}$	72	56.1	336.60
	60	20.40	102.00		84	56.1	392.70
	72	20.40	122.40	$\frac{1}{4}$	48	61.2	244.80
	84	20.40	142.80		60	61.2	306.00
	96	20.40	163.20		72	61.2	367.20
	120	20.40	204.00		84	61.2	428.40
$\frac{9}{16}$	96	22.95	183.60		96	61.2	489.60
$\frac{5}{8}$	48	25.50	102.00				
	60	25.50	127.50				

Steel
Plates

Blanchard
Grinding

HOT ROLLED STEEL PLATES (Cont.)**Over 1 1/2 Inches Thick — AISI-C1025****TYPICAL ANALYSIS**

Carbon	Manganese	Phosphorus	Sulphur
.22 to .29	.30 to .60	.04 Max.	.05 Max.

Will meet Spec. ASTM-A-7 providing plate is to be used as bearing plates in buildings or for general structural purposes.

Torch cut to any dimensions.

Thickness Inches	Width Inches	Approx. Wt. Lbs. per Lin. Ft.		Thickness Inches	Width Inches	Approx. Wt. Lbs. per Lin. Ft.	
1 5/8	60	66.3	331.50	3 1/4	48	132.6	530.40
	84	66.3	464.10		66	132.6	729.30
	96	66.3	530.40	3 1/2	48	142.8	571.20
1 3/4	48	71.4	285.60		66	142.8	785.40
	60	71.4	357.00		72	142.8	856.80
	72	71.4	428.40	3 3/4	48	153.0	612.00
	96	71.4	571.20		60	153.0	765.00
1 7/8	60	76.5	382.50	4	48	163.2	652.80
	84	76.5	535.50		60	163.2	816.00
2	48	81.6	326.40		72	163.2	979.20
	60	81.6	408.00	4 1/2	48	183.6	734.40
	72	81.6	489.60		60	183.6	918.00
	84	81.6	571.20		72	183.6	1101.60
	96	81.6	652.80	5	48	204.0	816.00
2 1/8	78	86.7	563.55		60	204.0	1020.00
2 1/4	48	91.8	367.20		72	204.0	1224.00
	60	91.8	459.00	5 1/2	48	224.4	897.60
	72	91.8	550.80		60	224.4	1122.00
	84	91.8	642.60	6	48	244.8	979.20
2 1/2	48	102.0	408.00		60	244.8	1224.00
	60	102.0	510.00		72	244.8	1468.80
	72	102.0	612.00	6 1/2	48	265.2	1060.80
	84	102.0	714.00		60	265.2	1326.00
	96	102.0	816.00		72	265.2	1591.20
2 3/4	48	112.2	448.80	7	48	285.6	1142.40
	60	112.2	561.00		60	285.6	1428.00
	72	112.2	673.20	8	48	326.4	1305.60
3	48	122.4	489.60		60	326.4	1632.00
	60	122.4	612.00	10	48	408.0	1632.00
	72	122.4	734.40		60	408.0	2040.00
	84	122.4	856.80				

UNIVERSAL MILL PLATES**1020 Grade****Stock Lengths 20 Feet**

Dimensions Inches	Approx. Wt. Lbs. per Foot	Dimensions Inches	Approx. Wt. Lbs. per Foot	Dimensions Inches	Approx. Wt. Lbs. per Foot
1/4x10	8.50	3/8x12	15.30	5/8x10	21.25
12	10.20	16	20.40	12	25.50
16	13.60	20	25.50	3/4x10	25.50
20	17.00	24	30.60	12	30.60
24	20.40	1/2x10	17.00	1 x10	34.00
5/16x10	10.63	12	20.40	12	40.80
12	12.75	20	34.00	1 1/4x12	51.00
7/8x10	12.75	24	40.80	1 1/2x12	61.20

WELDING QUALITY HOT ROLLED STEEL PLATES

5/8 Thru 3 Inches Thick — Spec. ASTM-A-373 and

Spec. QQ-S-741, Type 2, Class 1

TYPICAL ANALYSIS

Thickness	Carbon	Manganese	Phosphorus	Sulphur	Silicon
1/2" and under	.26	.30/.60	.04	.05	—
Over 1/2 to 1" incl.	.25	.50/.90	.04	.05	—
Over 1 to 2" incl.	.26	.50/.90	.04	.05	.15/.30
Over 2 to 3" incl.	.27	.50/.90	.04	.05	.15/.30

TYPICAL MECHANICAL PROPERTIES

Tensile Strength P.S.I.	Yield Point P.S.I.	Elongation in 8 Inches	Elongation in 2 Inches
58-75,000	32,000 Min.	21% Min.	24% Min.

This plate should be recommended where critical welding is required. The excellent weldability and good strength of this plate is maintained by the careful control of the carbon and manganese content, and the observance of special rolling practices at the mill.

Hot Rolled Steel Plate 5/8 thru 1/2 inch thick, listed on Page 223, to Spec. ASTM-A-7 will also conform to the above Specifications.

Thickness Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Inch	Width & Length Inches	Approx. Wt. Lbs. per Sq. Ft.		
5/8	72x384	25.50	153.00	1 1/4	72x240	51.00	357.00
	96x240	25.50	204.00		96x240	51.00	408.00
3/4	72x384	30.60	183.60	1 3/8	72x240	56.10	336.60
	96x240	30.60	244.80	1 1/2	72x240	61.20	367.20
7/8	96x240	35.70	285.60		96x240	61.20	489.60
1	72x384	40.80	244.80	1 3/4	84x240	71.40	499.80
	84x240	40.80	285.60	2	72x240	81.60	571.20
	96x240	40.80	326.40	2 1/2	72x240	102.00	714.00
1 1/8	96x240	45.90	367.20	3	72x192	122.40	856.80

FIREBOX STEEL PLATES

Spec. ASTM-A-285 (Latest) Grade C

Tensile Strength 55,000 to 65,000 P.S.I.

Thickness Inches	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thickness Inches	Width Inches	Approx. Wt. Lbs. per Sq. Ft.		
3/16	48	7.65	30.60	7/16	60	17.85	89.25
	60	7.65	38.25		72	17.85	107.10
	72	7.65	45.90		84	17.85	124.95
	84	7.65	53.55		96	17.85	142.80
	96	7.65	61.20		120	17.85	178.50
1/4	48	10.20	40.80	1/2	48	20.40	81.60
	60	10.20	51.00		60	20.40	102.00
	72	10.20	61.20		72	20.40	122.40
	84	10.20	71.40		84	20.40	142.80
	96	10.20	81.60		96	20.40	163.20
	120	10.20	102.00		120	20.40	204.00
5/16	48	12.75	51.00	5/8	48	25.50	102.00
	60	12.75	63.75		72	25.50	153.00
	72	12.75	76.50		96	25.50	204.00
	84	12.75	89.25	3/4	60	30.60	153.00
	96	12.75	102.00		72	30.60	183.60
	120	12.75	127.50		96	30.60	244.80
3/8	48	15.30	61.20	1	72	40.80	244.80
	60	15.30	76.50		96	40.80	326.40
	72	15.30	91.80	1 1/4	84	51.00	357.00
	84	15.30	107.10	1 1/2	84	61.20	428.40
	96	15.30	122.40	1 3/4	84	71.40	499.80
	120	15.30	153.00	2	84	81.60	571.20
7/16	48	17.85	71.40				

HIGH STRENGTH HOT ROLLED STEEL SHEETS AND PLATES

Spec. ASTM-A-242 and SAE-950

TYPICAL ANALYSIS

C	Mn	P	S	Si	Cu	Ni	Cr
.09	.38	.09	.033	.48	.41	.28	.84

TYPICAL MECHANICAL PROPERTIES

Thickness	Yield Point P.S.I.	Tensile Strength P.S.I.	% El. in 2"	Cold Bend
1/2" and under	50,000	70,000	22	180° D=1T
Over 1/2 to 1 1/2" incl.	47,000	67,000	..	180° D=2T
Over 1 1/2 to 3" incl.	43,000	63,000	24	180° D=3T

A high yield strength, low alloy steel with excellent fabricating and welding characteristics. Optimum strength is realized in this product by adding small amounts of a number of alloying elements thus eliminating the undesirable features caused by large additions of one alloy. Its balanced composition and the methods used to produce it result in a uniformly fine grained steel of outstanding workability.

High strength steel can be satisfactorily formed in press brakes and other cold forming equipment. It is generally found, however, that consistent with its higher strength, greater force is required for bending and increased radius of bends will prove an advantage. It can be sheared, punched, bent, flame-cut, hot formed, riveted and welded with the same methods and with few precautions beyond those required in the fabrication of ordinary steel. It will not flame harden in normal gas cutting operations. Speeds and torch adjustments are much the same as used in cutting ordinary steels of comparable thickness.

Welding can be accomplished by any of the methods used in welding ordinary structural steels. For metal arc welding, covered electrodes of the E-60 group will give ductile welds of adequate strength. If higher strength welds are desired, covered electrodes of the E-70 group will provide satisfactory welds. High Strength Steel is readily joined by submerged arc welding. Rods used for welding ordinary structural steel are suitable.

This product has a higher endurance strength and increased resistance to notch sensitivity than ordinary structural steels.

Substantially increased resistance to corrosion and appreciably increased life under abrasive conditions are other important factors in influencing the selection of this product for use over ordinary steels.

Stock Lengths: 96, 120, 144 and 240 Inches

SHEETS

U.S. Gage	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.	U.S. Gage	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.
14.....	36.....	3.125.....	9.375	12.....	72.....	4.375.....	26.25
14.....	48.....	3.125.....	12.500	10.....	48.....	5.620.....	22.48
12.....	48.....	4.375.....	17.500	10.....	60.....	5.620.....	28.10
12.....	60.....	4.375.....	21.875	10.....	72.....	5.620.....	33.72

PLATES

Thickness	Width	Approx. Wt.	Thickness	Width	Approx. Wt.		
Inches	Inches	Lbs. per Sq. Ft.	Inches	Inches	Lbs. per Sq. Ft.		
3/16.....	60.....	7.65.....	38.25	1/2.....	84.....	20.40.....	142.80
	72.....	7.65.....	45.90		96.....	20.40.....	163.20
1/4.....	72.....	10.20.....	61.20	5/8.....	84.....	25.50.....	178.50
	84.....	10.20.....	71.40	3/4.....	72.....	30.60.....	183.60
5/16.....	72.....	12.75.....	76.50		84.....	30.60.....	214.20
	84.....	12.75.....	89.25	1.....	84.....	40.80.....	285.60
3/8.....	72.....	15.30.....	91.80	1 1/8.....	90.....	45.90.....	344.25
	84.....	15.30.....	107.10	1 1/4.....	84.....	51.00.....	357.00

N-A-XTRA-100 HIGH STRENGTH HOT ROLLED STEEL SHEETS AND PLATES

Spec. MIL-S-13326 — Quenched and Tempered

TYPICAL ANALYSIS

C	Mn	S	P	Si	Cr	Mn	Zr
.15.....	.80.....	.025.....	.015.....	.70.....	.60.....	.15.....	.07

TYPICAL MECHANICAL PROPERTIES

Yield Strength.....	102,000 PSI	Tensile Strength.....	118,600 PSI
% EL. in 2"	25.1	% Reduction Area.....	61.4

Cold Bend Test—180° Around Pin Twice Diam. of Thick. of Metal

The figure 100 indicates 100,000 psi Minimum Yield Strength. Not manufactured to specified chemical ranges. Chemistry is so balanced as to furnish good weldability and desired mechanical properties.

A tough steel at normal and sub-normal temperatures, that can be cold formed, flame cut, sheared, machined and otherwise handled by conventional fabricating methods; when welding this steel, electrodes 11018 or 12018 should be used. Has three to five times the atmospheric corrosion resistance of commercial carbon sheets and plates.

Stock Lengths: 96, 120, 144 and 240 Inches

Thick- ness	Width	Approx. Wt.		Thick- ness	Width	Approx. Wt.	
		Sq. Ft.	lbs. per lin. ft.			Sq. Ft.	lbs. per lin. ft.
SHEETS							
.125.....	48.....	5.228.....	20.91	.125.....	72.....	5.228.....	31.37
.125.....	60.....	5.228.....	26.14				
PLATES							
3/16.....	48.....	7.65.....	30.60	3/8.....	72.....	15.30.....	91.80
	60.....	7.65.....	38.25	1/2.....	72.....	20.40.....	122.40
	72.....	7.65.....	45.90	3/4.....	72.....	30.60.....	183.60
1/4.....	48.....	10.20.....	40.80	7/8.....	72.....	35.70.....	214.20
	60.....	10.20.....	51.00	1.....	72.....	40.80.....	244.80
	72.....	10.20.....	61.20				

C1116 MODIFIED FREE MACHINING HOT ROLLED STEEL PLATES

TYPICAL ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur	Silicon
.18-.26	1.00-1.35	.04	.16-.26	.10 Max.

TYPICAL MECHANICAL PROPERTIES

Tensile Strength P.S.I.	Yield Point P.S.I.	Reduction of Area	Elongation in 2-Inches	Compressive Strength Lbs. per Square Inch
58-73,000	44-59,000	45-60%	26-36%	98,000 95,000 230,000

The Free Machining complement to the hot rolled steel plate is the C1116 Modified. Machining time is reduced as much as 35 to 40% over mild steel plate, with an increase in tool life of approximately 50%.

Typical applications where this material might be used are jigs, fixtures and other structural applications where strength and machinability are desired; injection molds for thermo-plastics, metal forming dies, mechanical rubber molds, sprockets, gears and dials.

This grade of steel is generally not recommended for welding. However if the welding practice is closely controlled a suitable weld can be made.

Stock Lengths: 96, 120, 144, 240 and 384 Inches

Thick- ness	Width	Approx. Wt.		Thick- ness	Width	Approx. Wt.	
		Inches	Inches			Sq. Ft.	lbs. per lin. ft.
1/4.....	84.....	10.2.....	71.40	1 1/4.....	72.....	71.4.....	428.40
5/16.....	84.....	12.8.....	89.25	2.....	84.....	81.6.....	571.20
3/8.....	84.....	15.3.....	107.10	2 1/4.....	72.....	91.8.....	550.80
1/2.....	84.....	20.4.....	142.80	2 1/2.....	84.....	102.0.....	714.00
5/8.....	84.....	25.5.....	178.50	2 3/4.....	72.....	112.2.....	673.20
3/4.....	84.....	30.6.....	214.20	3.....	72.....	122.4.....	734.40
7/8.....	72.....	35.7.....	249.90	3 1/2.....	66.....	142.8.....	785.40
1.....	84.....	40.8.....	244.80	4.....	60.....	163.2.....	816.00
1 1/8.....	72.....	45.9.....	275.40	5.....	60.....	204.0.....	1020.00
1 1/4.....	72.....	51.0.....	306.00	6.....	60.....	244.8.....	1224.00
1 1/2.....	72.....	61.2.....	367.20	7.....	60.....	285.6.....	1428.00

AMERICAN BUREAU OF SHIPS APPROVED STEEL HULL PLATES

CHEMICAL AND PHYSICAL TEST REPORTS CAN BE FURNISHED

Thickness Inch	Width and Length Inches		Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.
1/4	96x360		10.20	81.60
5/16	96x360		12.75	102.60
3/8	96x360		15.30	122.40
1/2	96x360		20.40	163.20

ABRASION RESISTING STEEL PLATES

TYPICAL ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur	Silicon
.35/.50	1.20/1.70	.05 Max.	.05 Max.	.20 Aim

The above may be expected to have a Brinell hardness of 200 to 250.

The advantage of abrasion resisting steel in cutting costs of handling abrasive materials is well established. It is indispensable for many applications, such as dredge pipe, digging and stacking ladders for dredges, road machinery, and farm machinery; sand and gravel, coal and concrete aggregate handling equipment, conveyors, chutes, liners for ore bins and dust collecting systems.

The ability of abrasion resisting steels to keep equipment operating for longer periods, to lessen shut down time and to decrease maintenance costs gives it new economic importance in view of present day increasing costs.

Thickness Inches	Width Inches		Approx. Wt., Lbs. per Sq. Ft.	Lin. Ft.
3/8	72		15.3	91.80
1/2	72		20.4	122.40
5/8	72		25.5	153.00
3/4	72		30.6	183.60

X-A-R ABRASION RESISTANT HOT ROLLED STEEL SHEETS AND PLATES

Grades: X-A-R 15 and X-A-R 30

Fully Quenched and Tempered

TYPICAL ANALYSES

X-A-R 15	X-A-R 30	X-A-R 15	X-A-R 30
Carbon.....0.17 %	0.27 %	Silicon.....0.60%	0.65%
Manganese.....0.80 %	0.85 %	Chromium.....0.55%	0.60%
Sulphur.....0.028%	0.028%	Molybdenum.....0.20%	0.15%
Phosphorus.....0.020%	0.020%	Zirconium.....0.06%	0.10%

TYPICAL MECHANICAL PROPERTIES: X-A-R 15 AND X-A-R 30

Hardness.....360/400 BHN Range	Elongation in 2".....	16%
Tensile Strength.....190,000 PSI	Reduction in Area.....	55%
Yield Strength.....175,000 PSI	Charpy V Impact, 75°.....	22 Ft.-Lbs.

Hardness Characteristic of 350/364 BH; gives results against wear and abrasion superior to those of other high carbon steels. Not manufactured to specified chemical ranges. Chemistry is so balanced as to furnish good weldability and desired mechanical properties. When high strength welds are desired, AWS E10015 or E12015 Electrodes should be used. Where extremely difficult welding conditions are involved and extensive flame cutting is used X-A-R 15 is recommended.

In forming, moderate bending can be performed within this range of hardness; a bend of 90° through a radius of 10X thickness minimum is recommended.

Stock Lengths: 240 Inches

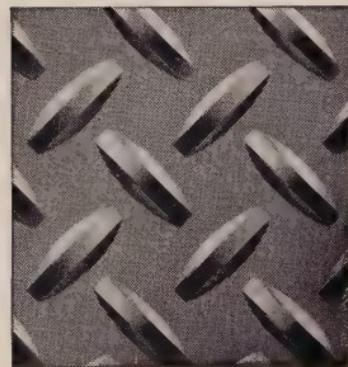
Thick- ness Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Thick- ness Inch	Width Inches	Approx. Wt. Lbs. per Sq. Ft.	Lin. Ft.
X-A-R 15 SHEETS						
1/8	72	5.228..... 31.37	1/8	72	5.228..... 31.37	
X-A-R 30 PLATES						
3/16	72	7.65..... 45.90	1/2	72	20.40..... 122.40	
1/4	72	10.20..... 61.20	3/4	72	30.60..... 183.60	
5/8	72	15.30..... 91.80				

STEEL FLOOR PLATES AND SHEETS

Spec. QQ-F-461, Type 2



"A.W." Super Diamond



Inland 4-way
Medium Pattern

Super safety floor plate for all traffic conditions. Engineered for complete safety from any angle under any condition, serving pedestrian and vehicular traffic with equal efficiency.

Note: Thickness measured through body of plate exclusive of pattern.

Patterns in "A.W." Super Diamond and Inland 4-Way Plates will not match.

Thickness	Max. Width	Approx. Wt.	Thickness	Max. Width	Approx. Wt.
In.	Ins.	Lbs. per Sq. Ft.	In.	Ins.	Lbs. per Sq. Ft.
		Lin. Ft.			Lin. Ft.

"A.W." SUPER DIAMOND

$\frac{1}{8}$	24	14	6.15	12.30	$\frac{5}{16}$	36	20	13.80	41.40
		36	6.15	18.45		48	24	13.80	55.20
		48	6.15	24.60		60	24	13.80	69.00
$\frac{3}{16}$	24	24	8.70	17.40		72	20	13.80	82.80
		30	8.70	21.75	$\frac{3}{8}$	24	24	16.35	32.70
		36	8.70	26.10		30	24	16.35	40.88
		48	8.70	34.80		36	20	16.35	49.05
		60	8.70	43.50		48	24	16.35	65.40
$\frac{1}{4}$	24	24	11.25	22.50		60	24	16.35	81.75
		30	11.25	28.13		72	20	16.35	98.10
		36	11.25	33.75	$\frac{1}{2}$	24	24	21.45	42.90
		48	11.25	45.00		30	24	21.45	53.63
		60	11.25	56.25		36	20	21.45	64.35
		72	11.25	67.50		48	24	21.45	85.80
$\frac{5}{16}$	24	24	13.80	27.60		60	24	21.45	107.25
		30	13.80	34.50		72	20	21.45	128.70

INLAND 4-WAY MEDIUM PATTERN

16 Ga.	30	10	3.00	7.50	$\frac{1}{8}$	48	16	6.15	24.60
		36	3.00	9.00		60	20	6.15	30.75
		48	3.00	12.00		72	20	6.15	36.90
14 Ga.	36	12	3.75	11.25	$\frac{3}{16}$	30	10	8.70	21.75
		48	3.75	15.00		36	12	8.70	26.10
12 Ga.	48	20	5.25	21.00		48	16	8.70	34.80
		60	5.25	26.25					

INLAND 4-WAY LARGE PATTERN

$\frac{3}{16}$	48	16	8.70	34.80	$\frac{1}{4}$	60	20	11.25	56.25
		60	8.70	43.50	$\frac{3}{8}$	60	20	16.35	81.75
		72	8.70	52.20	$\frac{1}{2}$	60	20	21.45	107.25
		48	16	45.00					

**COMPLETE
BLANCHARD
GRINDING SERVICE ***

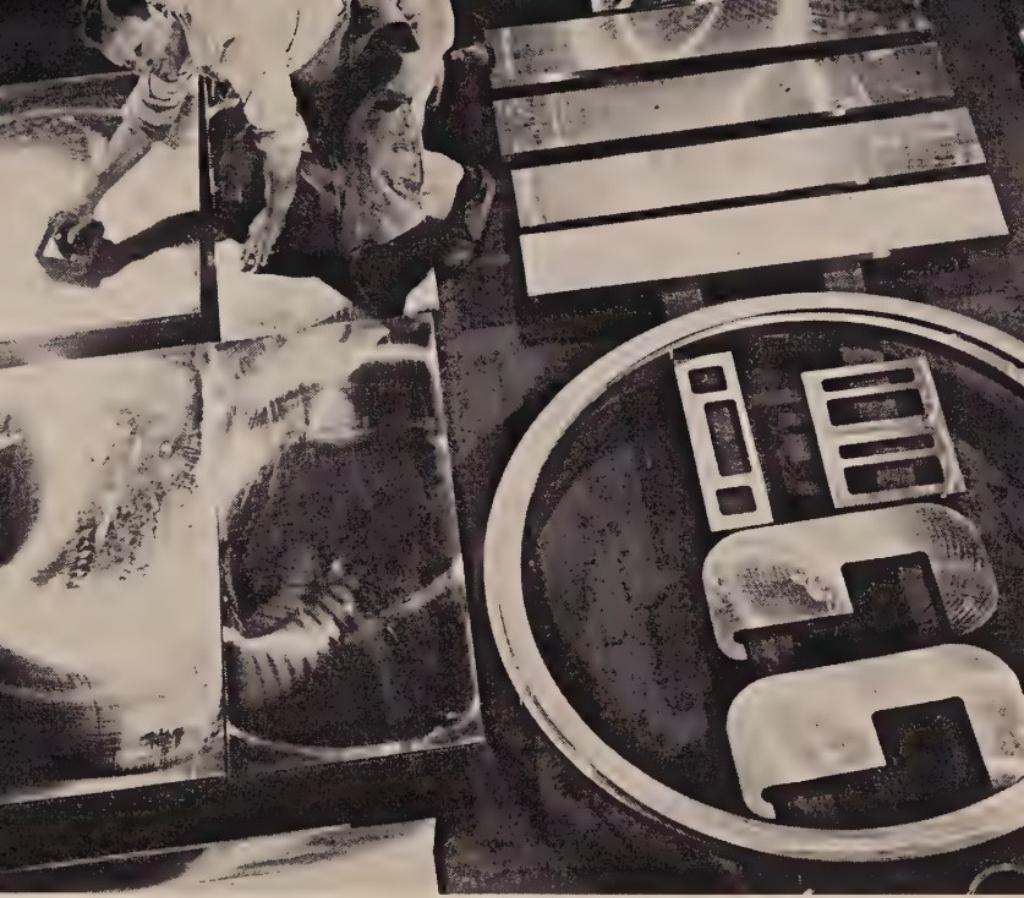
**COMPLETE STOCKS OF STEEL AND
NONFERROUS PLATES**

One Phone Call

**PRECISION GRINDING • PRECISION HANDLING
CAREFUL PACKING • PROMPT DELIVERY**

*Available on the West Coast

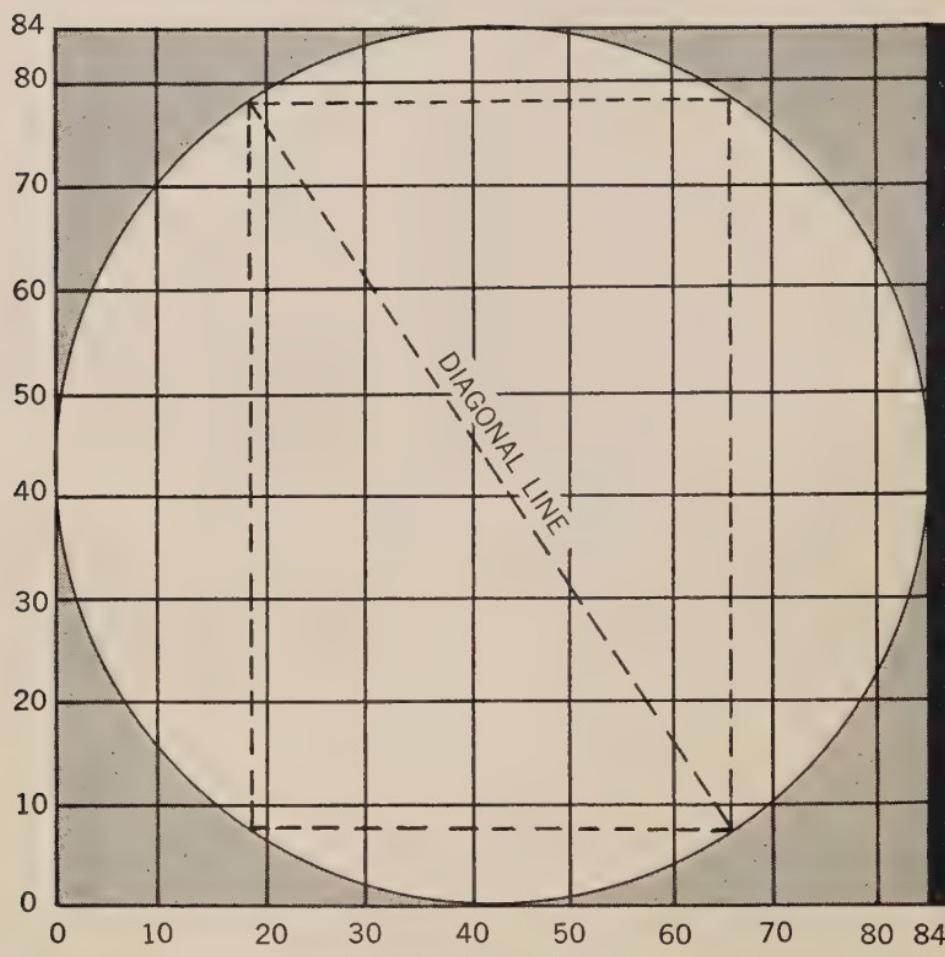




Mirror finish surfaces

Careful handling with magnetic hoist plus added care in packaging insures delivery in perfect condition.





Our Blanchard Grinding equipment will handle any plate, the overall dimensions of which will fit inside the diameter of the circle shown above, that is 84". The graph can be used to determine the diagonal measurement of a right triangle, square or rectangular piece and this determines if a piece of plate of a given size can be ground on our equipment.

The graph is calibrated in inches, both on the left and lower edge. To determine the diagonal measurement, measure from one corner of the plate to the opposite diagonal corner. (See sketch above.)

It is possible to increase the maximum dimension of 84" to 91" by using blend grinding. If the piece to be ground has a 10" or larger center hole, this dimension may be increased to 99".

Our equipment enables us to assure the following tolerances under standard conditions:

Two sides to a specified thickness $\pm .002$ (parallel, but not flat).

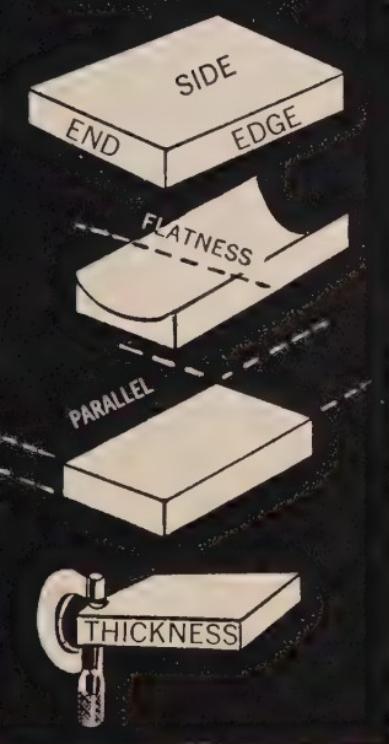
Two sides to a specified thickness $\pm .002$ (parallel $\pm .002$).

Two sides clean up flat $\pm .004$ (parallel $\pm .002$) hold to size.

Closer tolerances can be attained under special conditions.

Standard work is a commercial grind finish — 60 micro-inch. Other finishes upon application.

**DRAWING SHOWING DEFINITIONS
OF TERMS APPLYING TO
BLANCHARD GRINDING**



STRESS RELIEVING may be necessary on plates to be ground flat and parallel, depending on surface area and thickness of plates to be ground.

SPECIAL HANDLING AND PACKING of finished plates is a feature of the Blanchard Grinding Service offered by Ducommun. Finished plates are carefully handled by magnetic hoists to protect precision ground surfaces. Each ground plate is carefully wrapped to protect the surfaces and edges during delivery to customer.

TORCH CUTTING: Unless the customer specifies otherwise, any plate that is to be ground will be torch cut on all four sides.

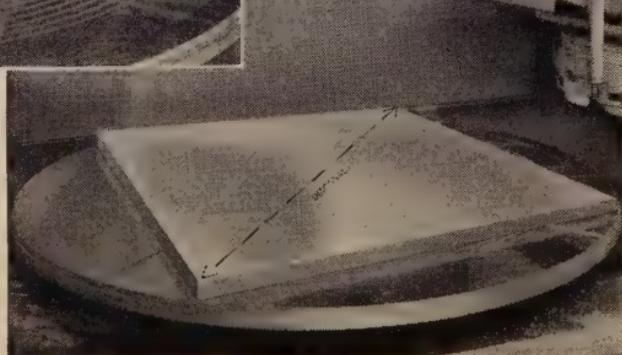
Plates may be ground on all surfaces up to 32" in height. Our facilities permit the handling of production runs.

Non-magnetic metals such as brass, bronze and aluminum, depending on size, shape and thickness, can also be Blanchard Ground.



Close-up of a piece of plate standing on its edge for edge or end grinding. Note that highest capacity for edge or end grinding is 32".

Close-up of a piece of plate lying on the chuck to illustrate how dimensions should be measured.





Grinding all four edges of several duplicate parts clamped together.

Precision Grinding means precision checking.



HOT ROLLED STEEL WIRE, BARS AND STRIP

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Steel
Bars,
Strip
Hot
Rolled

236 DUCOMMUN METALS & SUPPLY CO.

ROUND BRIGHT BASIC STEEL WIRE

1010 — Straightened and Cut

Stock Lengths 20 Feet

Diameter Inches		Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
1/8		.042	.84
5/16		.094	1.88
1/4		.167	3.34
9/16		.261	5.22
5/8		.376	7.52

ROUND HOT ROLLED STEEL BARS

Stock Lengths 20 Feet

Diam. Inches		Approx. Wt., Lbs. per Lin. Ft.	20 Ft.	Diam. Inches		Approx. Wt., Lbs. per Lin. Ft.	20 Ft.
M1020 OR SPEC. ASTM-A-7				C1018 SPECIAL BAR QUALITY			
MERCHANT BAR QUALITY				Carbon	.15 to .20		
Carbon	.17 to .24			Manganese	.60 to .90		
Manganese	.30 to .60			3	24.03		480.60
1/4	.167		3.34	3 1/4	28.21		564.20
5/16	.261		5.22	3 1/2	32.71		654.20
3/8	.376		7.52	3 3/4	37.55		751.00
7/16	.511		10.22	4	42.73		854.60
1/2	.668		13.36	4 1/4	48.23		964.60
9/16	.845		16.90	4 1/2	54.08		1081.60
5/8	1.043		20.86	4 3/4	60.25		1205.00
3/4	1.502		30.04	5	66.76		1335.20
7/8	2.044		40.88	5 1/4	73.60		1472.00
1	2.670		53.40	5 1/2	80.78		1615.60
1 1/8	3.379		67.58	5 3/4	88.29		1765.80
1 1/4	4.172		83.44	6	96.13		1922.60
1 3/8	5.049		101.00	6 1/4	104.31		2086.20
1 1/2	6.008		120.16	6 1/2	112.80		2256.00
1 5/8	7.051		141.02	6 3/4	121.67		2433.40
1 3/4	8.178		163.56	7	130.85		2617.00
2	10.680		213.60	7 1/4	140.36		2807.20
2 1/8	12.06		241.20	7 1/2	150.20		3004.00
2 1/4	13.52		270.40	7 3/4	160.39		3207.80
2 1/2	16.69		333.80	8	170.90		3418.00
2 3/4	20.20		404.00	9	216.30		4326.00

GALVANIZED

Size Inches		Approx. Wt., Lbs. per Lin. Ft.	20 Ft.	Size Inches		Approx. Wt., Lbs. per Lin. Ft.	20 Ft.
1/4	.175		3.51	5/8	.1095		21.90
5/16	.274		5.48	3/4	1.577		31.54
3/8	.395		7.90	1	2.804		56.07
1/2	.701		14.03				

TOLERANCES — ROUND AND SQUARE

MILD STEEL BARS (BLACK)

Diameters Inch	Over Dec. Inch	Under Dec. Inch	Diameters Inch	Over Dec. Inch	Under Dec. Inch
5/8 & 7/16	.006	.006	1 3/4 & 2	1/64	1/64
1/2 to 5/8	.007	.007	2 1/2 to 2 1/2	1/32	0
3/4 & 7/8	.008	.008	2 3/4 to 3 1/2	3/64	0
1	.009	.009	3 3/4 to 4 1/2	1/16	0
1 1/8	.010	.010	4 3/4 to 5 1/2	5/64	0
1 1/4	.011	.011	5 3/4 to 6 1/2	1/8	0
1 3/8	.012	.012	6 3/4 to 8	5/32	0
1 1/2	.014	.014			

ROUND HOT ROLLED BOLT STOCK

M1020 or Spec. ASTM-A-7 Merchant Bar Quality

Carbon .17 to .24 Manganese .30 to .60

1/64 INCH UNDERSIZE — EXCEPT 1 INCH WHICH IS .990 DECIMAL INCH

Stock Lengths 20 Feet

Actual Size Diam. Inches				Approx. Wt., Lbs. per Lin. Ft.				Actual Size Diam. Inches				Approx. Wt., Lbs. per Lin. Ft.			
				20 Ft.								20 Ft.			
.3/8	.23/64	.345	.345	.345	.345	.345	.345	.3/4	.47/64	.47/64	.47/64	.1,440	.1,440	.1,440	.28.80
1/2	.31/64	.627	.627	.627	.627	.627	.627	7/8	.55/64	.55/64	.55/64	.1,970	.1,970	.1,970	.39.40
5/8	.39/64	.992	.992	.992	.992	.992	.992	1	.990	.990	.990	.2,590	.2,590	.2,590	.51.80

C1042 — C1045 ROUND HOT ROLLED CARBON STEEL BARS

Special Bar Quality — Machine Straightened

Carbon .40 to .50 Manganese .60 to .90

Stock Lengths 20 Feet — Color Code — Red

Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.	Diam. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
.5/8	.668	13.36	2 5/8	18.40	368.00
3/4	1.043	20.86	2 3/4	20.20	404.00
7/8	1.502	30.04	3	24.03	480.60
1	2.044	40.88	3 1/4	28.21	564.20
1 1/8	2.670	53.40	3 1/2	32.71	654.20
1 1/4	3.379	67.58	3 3/4	37.55	751.00
1 5/16	4.172	83.44	4	42.73	854.60
1 3/8	4.600	92.00	4 1/4	48.23	964.60
1 7/16	5.049	101.00	4 1/2	54.08	1081.60
1 15/16	5.518	110.36	5	66.76	1335.20
1 1/2	6.008	120.16	5 1/4	73.60	1472.00
1 11/16	7.604	152.08	5 1/2	80.78	1615.60
1 3/4	8.178	163.56	6	96.13	1922.60
2	10.680	213.60	6 1/4	104.31	2086.20
2 1/16	11.360	227.20	6 1/2	112.80	2256.00
2 1/8	12.060	241.20	7	130.85	2617.00
2 1/4	13.519	270.38	7 1/4	140.36	2807.20
2 3/8	15.060	301.20	7 1/2	150.20	3004.00
2 1/2	16.690	333.80	8	170.90	3418.00

ALLOWANCE FOR MACHINING HOT ROLLED CARBON BARS

When ordering hot-rolled bars that are to be machined, experience has shown that it is advisable for the purchaser to make adequate allowances for finishing, and specify hot-rolled sizes accordingly.

These allowances require consideration of the manufacturing practice utilized to remove the surface metal, the length and size of bars, straightness, size tolerance and out-of-round tolerance. Bars are generally straightened before turning.

It is advisable that the allowances made be adequate to permit an actual stock removal from the surface of not less than the amount shown.

Specified Sizes, Inches	Minimum Stock Removal per Side, Inches	Minimum Stock Removal from Diameter, Inches
1 1/2 to 3 incl.	.063	.125
Over 3 to 8 incl.	.125	.250

Recommended Stock Removal for Steel Subject to Magna-Flux Inspection

Up to 1/2 incl.	.030	.060
Over 1/2 to 3/4 incl.	.045	.090
Over 3/4 to 1 incl.	.060	.120
Over 1 to 1 1/2 incl.	.075	.150
Over 1 1/2 to 2 incl.	.090	.180
Over 2 to 2 1/2 incl.	.125	.250
Over 2 1/2 to 3 1/2 incl.	.156	.312
Over 3 1/2 to 4 1/2 incl.	.187	.374
Over 4 1/2 to 6 incl.	.250	.500

DEFORMED REINFORCING STEEL BARS**Round — Intermediate Grade**

Yield Point 40,000 P.S.I. — Tensile Strength 70,000 to 90,000 P.S.I.



This material is made from new Billet stock and conforms to the specifications of the American Society for Testing Materials ASTM A-305 and A-15.

Bend Test Requirements

Bar Nos. 3, 4 and 5—90 Degrees around 3x diameter.

Bar Nos. 6, 7 and 8—90 Degrees around 4x diameter.

Stock Lengths

Nos. 3 and 4—20 and 30 Feet

Nos. 5 and 6—20, 30 and 40 Feet.

Bar Number	Unit Wt. Lbs. per Foot	Diam. Inches	Cross-Sec- tional Area, Sq. Inches	Perimeter, Inches	Sq. In. Bonding Area per Ft. of Bar
3	0.376	0.375	0.11	1.178	14.1372
4	0.668	0.500	0.20	1.571	18.8496
5	1.043	0.625	0.31	1.963	23.5620
6	1.502	0.750	0.44	2.356	28.2744
7	2.044	0.875	0.60	2.749	32.9868
8	2.670	1.000	0.79	3.142	37.6992

SQUARE HOT ROLLED STEEL BARS**Stock Lengths 20 Feet**

Size Inches	Approx. Wt., Lbs. per Lin. Ft.	Size Inches	Approx. Wt., Lbs. per Lin. Ft.	20 Ft.

M1020 OR SPEC. ASTM-A-7 MERCHANT BAR QUALITY

Carbon .17 to .24 Manganese .30 to .60

1/4	.213	4.26	1 1/8	4.303	86.06
5/16	.332	6.64	1 1/4	5.313	106.26
3/8	.478	9.56	1 1/8	6.428	128.56
7/16	.651	13.02	1 1/2	7.650	153.00
1/2	.850	17.00	1 1/8	8.978	179.56
5/8	1.328	26.56	1 3/4	10.413	208.26
3/4	1.913	38.26	2	13.600	272.00
7/8	2.603	52.06	2 1/4	17.213	344.26
1	3.400	68.00	2 1/2	21.250	425.00

C1018 SPECIAL BAR QUALITY

Carbon .15 to .20 Manganese .60 to .90

3	30.600	612.00	4	54.400	1088.00
3 1/2	41.650	833.00			

C1045 — C1055 FLAT HOT ROLLED PLOW STEEL**Special Bar Quality — Stock Lengths 20 Feet**

Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.	Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
1/4x2	1.700	34.00	3/4x8	20.40	408.00
5/16x4	4.250	85.00	1 1/4x2 1/2	10.63	212.60
1/2x1	1.700	34.00	3	12.75	255.00
5/8x5	10.630	212.60	8	34.00	680.00

THICKNESS AND WIDTH TOLERANCES**H. R. FLAT STEEL BARS**

Spec. Widths	Variations from thickness, for Thickness Given, Over & Under					Variation from Widths	
	Under 1/4 Incl.	1/4 to 1/2 Incl.	Over 1/2 To 1 Incl.	Over 1 To 2 Incl.	Over 2	Over	Under
To 1 incl.	0.007	0.008	0.010	..	..	1/64	1/64
Over 1 to 2 incl.	0.007	0.012	0.015	1/32	..	1/32	1/32
Over 2 to 4 incl.	0.008	0.015	0.020	1/32	3/64	1/16	1/32
Over 4 to 6 incl.	0.009	0.015	0.020	1/32	1/16	3/32	1/16

HOT ROLLED STRIP STEEL**1010 — (Band Iron)**

Stock Lengths 20 Feet

Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.	Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
1/8 x 3/8	.159	3.18	3/16 x 3/8	.239	4.78
1/2	.213	4.26	1/2	.319	6.38
5/8	.266	5.32	5/8	.398	7.96
3/4	.319	6.38	3/4	.478	9.56
7/8	.372	7.44	7/8	.558	11.16
1	.425	8.50	1	.638	12.76
1 1/8	.478	9.56	1 1/8	.717	14.34
1 1/4	.531	10.62	1 1/4	.797	15.94
1 1/2	.638	12.76	1 1/2	.956	19.12
1 3/4	.744	14.88	1 3/4	1.116	22.32
2	.850	17.00	2	1.275	25.50
2 1/4	.956	19.12	2 1/4	1.434	28.68
2 1/2	1.063	21.26	2 1/2	1.594	31.88
2 3/4	1.169	23.38	2 3/4	1.753	35.06
3	1.275	25.50	3	1.913	38.26
3 1/2	1.488	29.76	3 1/2	2.231	44.62
4	1.700	34.00	4	2.550	51.00
4 1/2	1.913	38.26	4 1/2	2.869	57.38
5	2.125	42.50	5	3.188	63.76
6	2.550	51.00	6	3.825	76.50

GALVANIZED

1/8 x 1/2	.224	4.48	3/16 x 3/4	.502	10.40
3/4	.335	6.70	1	.670	13.40
1	.446	8.92	1 1/2	1.004	20.08
1 1/4	.558	11.16	2	1.339	26.78
1 1/2	.670	13.40			
2	.893	17.86			

For heavier than $\frac{3}{16}$ inch, see Flat, Hot Rolled Steel Bars.

We can furnish all sizes of black hot rolled strip steel shown above in galvanized finish.

FLAT HOT ROLLED STEEL BARS**M1020 OR SPEC. ASTM-A-7 MERCHANT BAR QUALITY**

Carbon .17 to .24 Manganese .30 to .60

Stock Lengths 20 Feet

Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.	Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
1/4 x 3/8	.319	6.38	1/4 x 7	5.950	119.00
1/2	.425	8.50	8	6.800	136.00
5/8	.531	10.62	5/16 x 1/2	.531	10.62
3/4	.638	12.76	3/4	.797	15.94
7/8	.744	14.88	1	1.063	21.26
1	.850	17.00	1 1/4	1.328	26.56
1 1/8	.956	19.12	1 1/2	1.594	31.88
1 1/4	1.063	21.26	1 3/4	1.859	37.18
1 1/2	1.275	25.50	2	2.125	42.50
1 3/4	1.488	29.76	2 1/2	2.656	53.12
2	1.700	34.00	3	3.188	63.76
2 1/4	1.913	38.26	3 1/2	3.719	74.38
2 1/2	2.125	42.50	4	4.250	85.00
2 3/4	2.338	46.76	4 1/2	4.781	95.62
3	2.550	51.00	5	5.313	106.26
3 1/2	2.975	59.50	6	6.375	127.50
4	3.400	68.00	8	8.500	170.00
4 1/2	3.825	76.50			
5	4.250	85.00			
6	5.100	102.00			

Continued on Page 240

FLAT HOT ROLLED STEEL BARS (Cont.)**M1020 OR SPEC. ASTM-A-7 MERCHANT BAR QUALITY**

Carbon .17 to .24 Manganese .30 to .60

†C1018 SPECIAL BAR QUALITY

Carbon .15 to .20 Manganese .60 to .90

Stock Lengths 20 Feet

Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.	Dimen. Inches	Approx. Wt. Lbs. per Lin. Ft.	20 Ft.
3/8 x 1/2.....	.638.....	12.76	3/4 x 1 1/4.....	3.188.....	63.76
5/8.....	.797.....	15.94	1 1/2.....	3.825.....	76.50
3/4.....	.956.....	19.12	1 3/4.....	4.463.....	89.26
7/8.....	1.116.....	22.32	2.....	5.100.....	102.00
1.....	1.275.....	25.50	2 1/2.....	6.375.....	127.50
1 1/4.....	1.594.....	31.88	3.....	7.650.....	153.00
1 1/2.....	1.913.....	38.26	3 1/2.....	8.925.....	178.50
1 3/4.....	2.231.....	44.62	4.....	10.200.....	204.00
2.....	2.550.....	51.00	4 1/2.....	11.480.....	229.60
2 1/4.....	2.869.....	57.38	5.....	12.750.....	255.00
2 1/2.....	3.188.....	63.76	6.....	15.300.....	306.00
2 3/4.....	3.506.....	70.12	7.....	17.850.....	357.00
3.....	3.825.....	76.50	8.....	20.400.....	408.00
3 1/2.....	4.463.....	89.26	7/8 x 2.....	5.950.....	119.00
4.....	5.100.....	102.00	2 1/2.....	7.438.....	148.80
4 1/2.....	5.738.....	114.76	3.....	8.925.....	178.50
5.....	6.375.....	127.50	4.....	11.900.....	238.00
5 1/2.....	7.010.....	140.20	5.....	14.880.....	297.60
6.....	7.650.....	153.00	6.....	17.850.....	357.00
7.....	8.930.....	178.60	1 x 1 1/4.....	4.250.....	85.00
8.....	10.200.....	204.00	1 1/2.....	5.100.....	102.00
1/2 x 3/4.....	1.275.....	25.50	1 3/4.....	5.950.....	119.00
1.....	1.700.....	34.00	2.....	6.800.....	136.00
1 1/4.....	2.125.....	42.50	2 1/2.....	8.500.....	170.00
1 1/2.....	2.550.....	51.00	3.....	10.200.....	204.00
1 3/4.....	2.975.....	59.50	3 1/2.....	11.900.....	238.00
2.....	3.400.....	68.00	4.....	13.600.....	272.00
2 1/4.....	3.825.....	76.50	4 1/2.....	15.300.....	306.00
2 1/2.....	4.250.....	85.00	5.....	17.000.....	340.00
2 3/4.....	4.675.....	93.50	6.....	20.400.....	408.00
3.....	5.100.....	102.00	8.....	27.200.....	544.00
3 1/2.....	5.950.....	119.00	1 1/4 x 2.....	8.500.....	170.00
4.....	6.800.....	136.00	2 1/2.....	10.630.....	212.60
4 1/2.....	7.650.....	153.00	3.....	12.750.....	255.00
5.....	8.500.....	170.00	3 1/2.....	14.880.....	297.60
5 1/2.....	9.350.....	187.00	4.....	17.000.....	340.00
6.....	10.200.....	204.00	5.....	21.250.....	425.00
7.....	11.900.....	238.00	6.....	25.500.....	510.00
8.....	13.600.....	272.00	8.....	34.000.....	680.00
5/8 x 1.....	2.125.....	42.50	1 1/2 x 2.....	10.200.....	204.00
1 1/4.....	2.656.....	53.12	2 1/2.....	12.750.....	255.00
1 1/2.....	3.188.....	63.76	3.....	15.300.....	306.00
1 3/4.....	3.719.....	74.38	4.....	20.400.....	408.00
2.....	4.250.....	85.00	5.....	25.500.....	510.00
2 1/4.....	4.781.....	95.62	6.....	30.600.....	612.00
2 1/2.....	5.313.....	106.26	8†.....	40.800.....	816.00
2 3/4.....	5.844.....	116.90	2 x 3.....	20.400.....	408.00
3.....	6.375.....	127.50	4.....	27.200.....	544.00
3 1/2.....	7.438.....	148.76	5.....	34.000.....	680.00
4.....	8.500.....	170.00	6†.....	40.800.....	816.00
4 1/2.....	9.563.....	191.26	2 1/2 x 4.....	34.000.....	680.00
5.....	10.630.....	212.60	5†.....	42.500.....	850.00
6.....	12.750.....	255.00	6†.....	51.000.....	1020.00
7.....	14.880.....	297.60	3 x 4†.....	40.800.....	816.00
8.....	17.000.....	340.00	5†.....	51.000.....	1020.00
3/4 x 1.....	2.550.....	51.00	6†.....	61.200.....	1224.00

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1/4 x 3/4.....	.670.....	13.40	1/4 x 1 1/2.....	1.389.....	26.78
1.....	.893.....	17.86	2.....	1.785.....	35.70

We can furnish all of the above sizes in galvanized finish.

HOT ROLLED STEEL ANGLES, CHANNELS, TEES, BEAMS AND STRUCTURAL SECTIONS

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STRUCTURAL SPECIALISTS

To help you with your fabricating problems
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Steel
Angles,
Channels,
Beams

HOT ROLLED STEEL BAR SIZE ANGLES**Spec. ASTM-A-7 or M1020 Merchant Bar Quality****Stock Lengths 20, 30 and 40 Feet**

Dimensions, Inches	Per Foot	Approximate Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{8}$	.38	7.6	11.4	
$\frac{5}{8} \times \frac{5}{8} \times \frac{1}{8}$	.48	9.6	14.4	
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$	.59	11.8	17.7	
$\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$	.70	14.0	21.0	
$1 \times \frac{5}{8} \times \frac{1}{8}$	.64	12.8	19.2	
$1 \times 1 \times \frac{1}{8}$	.80	16.0	24.0	32.0
$\frac{3}{16}$	1.16	23.2	34.8	46.4
$\frac{1}{4}$	1.49	29.8	44.7	59.6
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	1.01	20.2	30.3	40.4
$\frac{3}{16}$	1.48	29.6	44.4	59.2
$\frac{1}{4}$	1.92	38.4	57.6	76.8
$1\frac{3}{8} \times \frac{7}{8} \times \frac{1}{8}$	.91	18.2	27.3	36.4
$1\frac{1}{2} \times 1\frac{1}{4} \times \frac{3}{16}$	1.00	20.0	30.0	40.0
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$	1.23	24.6	36.9	49.2
$\frac{3}{16}$	1.80	36.0	54.0	72.0
$\frac{1}{4}$	2.34	46.8	70.2	93.6
$\frac{5}{16}$	2.86	57.2	85.8	114.4
$\frac{3}{8}$	3.35	67.0	100.5	134.0
$1\frac{3}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	1.23	24.6	36.9	49.2
$1\frac{3}{4} \times 1\frac{3}{4} \times \frac{1}{8}$	1.44	28.8	43.2	57.6
$\frac{3}{16}$	2.12	42.4	63.6	84.8
$\frac{1}{4}$	2.77	55.4	83.1	110.8
$2 \times 1\frac{1}{2} \times \frac{1}{8}$	1.44	28.8	43.2	57.6
$\frac{3}{16}$	2.12	42.4	63.6	84.8
$\frac{1}{4}$	2.77	55.4	83.1	110.8
$2 \times 2 \times \frac{1}{8}$	1.65	33.0	49.5	66.0
$\frac{3}{16}$	2.44	48.8	73.2	97.6
$\frac{1}{4}$	3.19	63.8	95.7	127.6
$\frac{5}{16}$	3.92	78.4	117.6	156.8
$\frac{3}{8}$	4.70	94.0	141.0	188.0
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$	2.44	48.8	73.2	97.6
$\frac{1}{4}$	3.19	63.8	95.7	127.6
$2\frac{1}{2} \times 2 \times \frac{3}{16}$	2.75	55.0	82.5	110.0
$\frac{1}{4}$	3.62	72.4	108.6	144.8
$\frac{5}{16}$	4.50	90.0	135.0	180.0
$\frac{3}{8}$	5.30	106.0	159.0	212.0
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{16}$	3.07	61.4	92.1	122.8
$\frac{1}{4}$	4.10	82.0	123.0	164.0
$\frac{5}{16}$	5.00	100.0	150.0	200.0
$\frac{3}{8}$	5.90	118.0	177.0	236.0
$\frac{1}{2}$	7.70	154.0	231.0	308.0

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$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$.62	12.4	18.6	24.8
$1 \times 1 \times \frac{1}{8}$.84	16.8	25.2	33.6
$\frac{3}{16}$	1.22	24.4	36.6	48.8
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	1.06	21.2	31.8	42.4
$\frac{3}{16}$	1.55	31.0	46.5	62.0
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$	1.28	25.6	38.4	51.2
$\frac{3}{16}$	1.89	37.8	56.7	75.6
$\frac{1}{4}$	2.46	49.2	73.8	98.4
$2 \times 2 \times \frac{1}{8}$	1.73	34.6	51.9	69.2
$\frac{3}{16}$	2.56	51.2	76.8	102.4
$\frac{1}{4}$	3.35	67.0	100.5	134.0

We can furnish most sizes of hot rolled angles in galvanized finish.

HOT ROLLED STEEL STRUCTURAL SIZE ANGLES

Spec. ASTM-A-36 or ASTM-A-7

Stock Lengths 20, 30, 40 and 60 Feet

Dimensions, Inches		Per Foot	Approximate Weight, Pounds			
			20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
3 x 2	$\frac{3}{16}$	3.07	61	92	123	184
	$\frac{1}{4}$	4.1	82	123	164	246
	$\frac{5}{16}$	5.0	100	150	200	300
	$\frac{3}{8}$	5.9	118	177	236	354
	$\frac{1}{2}$	7.7	154	231	308	462
3 x 2 1/2 x 1/4	$\frac{1}{2}$	4.5	90	135	180	270
	$\frac{5}{16}$	5.6	112	168	224	336
	$\frac{3}{8}$	6.6	132	198	264	396
	$\frac{1}{2}$	8.5	170	255	340	510
3 x 3	$\frac{3}{16}$	3.7	74	111	148	223
	$\frac{1}{4}$	4.9	98	147	196	294
	$\frac{5}{16}$	6.1	122	183	244	366
	$\frac{3}{8}$	7.2	144	216	288	432
	$\frac{1}{2}$	9.4	188	282	376	564
$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$	$\frac{1}{2}$	4.9	98	147	196	294
	$\frac{5}{16}$	6.1	122	183	244	366
	$\frac{3}{8}$	7.2	144	216	288	432
	$\frac{1}{2}$	9.4	188	282	376	564
$3\frac{1}{2} \times 3$	$\frac{1}{4}$	5.4	108	162	216	324
	$\frac{5}{16}$	6.6	132	198	264	396
	$\frac{3}{8}$	7.9	158	237	316	474
	$\frac{1}{2}$	10.2	204	306	408	612
$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{4}$	$\frac{1}{2}$	5.8	116	174	232	348
	$\frac{5}{16}$	7.2	144	216	288	432
	$\frac{3}{8}$	8.5	170	255	340	510
	$\frac{1}{2}$	11.1	222	333	444	666
4 x 3	$\frac{1}{4}$	5.8	116	174	232	348
	$\frac{5}{16}$	7.2	144	216	288	432
	$\frac{3}{8}$	8.5	170	255	340	510
	$\frac{1}{2}$	11.1	222	333	444	666
4 x 3 1/2 x 5/16	$\frac{1}{2}$	7.7	154	231	308	462
	$\frac{3}{8}$	9.1	182	273	364	546
	$\frac{1}{2}$	11.9	238	357	476	714
4 x 4	$\frac{1}{4}$	6.6	132	198	264	396
	$\frac{5}{16}$	8.2	164	246	328	492
	$\frac{3}{8}$	9.8	196	294	392	588
	$\frac{1}{2}$	12.8	256	384	512	768
	$\frac{5}{8}$	15.7	314	471	628	942
	$\frac{3}{4}$	18.5	370	555	740	1110
5 x 3	$\frac{1}{4}$	6.6	132	198	264	396
	$\frac{5}{16}$	8.2	164	246	328	492
	$\frac{3}{8}$	9.8	196	294	392	588
	$\frac{1}{2}$	12.8	256	384	512	768
	$\frac{5}{8}$	15.7	314	471	628	942
5 x 3 1/2 x 5/16	$\frac{1}{2}$	8.7	174	261	348	522
	$\frac{3}{8}$	10.4	208	312	416	624
	$\frac{1}{2}$	13.6	272	408	544	816
	$\frac{5}{8}$	16.8	336	504	672	1008
5 x 5	$\frac{3}{8}$	12.3	246	369	492	738
	$\frac{1}{2}$	16.2	324	486	648	972
	$\frac{5}{8}$	20.0	400	600	800	1200

HOT ROLLED STEEL STRUCTURAL SIZE ANGLES (Cont.)**Spec. ASTM-A-36 or ASTM-A-7**

Stock Lengths 20, 30, 40 and 60 Feet

Dimensions, Inches	Per Foot	Approximate Weight, Pounds			
		20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
6x3½x ¼	7.9	158	237	316	474
5/16	9.8	196	294	392	588
3/8	11.7	234	351	468	702
1/2	15.3	306	459	612	918
6x4 x 5/16	10.3	206	309	412	618
3/8	12.3	246	369	492	738
1/2	16.2	324	486	648	972
5/8	20.0	400	600	800	1200
3/4	23.6	472	708	944	1416
6x6 x 3/8	14.9	298	447	596	894
1/2	19.6	392	588	784	1176
5/8	24.2	484	726	968	1452
3/4	28.7	574	861	1148	1722
1	37.4	748	1122	1496	2244
7x4 x 3/8	13.6	272	408	544	816
5/16	15.8	316	474	632	984
1/2	17.9	358	534	716	1074
8x4 x 1/2	19.6	392	588	784	1176
5/8	24.2	484	726	968	1452
3/4	28.7	574	861	1148	1722
8x6 x 1/2	23.0	460	690	920	1380
5/8	28.5	570	855	1140	1710
3/4	33.8	676	1014	1352	2028
1	44.2	884	1326	1768	2652
8x8 x 1/2	26.4	528	792	1056	1584
5/8	32.7	654	981	1308	1962
3/4	38.9	778	1167	1556	2334
1	51.0	1020	1530	2040	3060

HOT ROLLED STEEL BAR SIZE CHANNELS**Spec. ASTM-A-7 or M1020 Merchant Bar Quality**

Stock Lengths 20, 30 and 40 Feet

Dimensions, Inches	Per Foot	Approximate Weight, Pounds		
		20-Ft. Length	30-Ft. Length	40-Ft. Length
3/4 x 3/8x1/8	.54	10.8	16.2	21.6
7/8 x 7/16x1/8	.69	13.8	20.7	27.6
1 x 3/8x1/8	.68	13.6	20.4	27.2
1 x 1/2x1/8	.80	16.0	24.0	32.0
1 1/4 x 1/2x1/8	1.00	20.0	30.0	40.0
1 1/2 x 1/2x1/8	1.12	22.4	33.6	44.8
1 1/2 x 3/4x1/8	1.17	23.4	35.1	46.8
1 3/4 x 1/2x3/16	1.55	31.0	46.5	62.0
2 x 1/2x1/8	1.34	26.8	40.2	53.6
2 x 3/16x3/16	1.76	35.2	52.8	70.4
2 x 1 x 1/8*	1.59	31.8	47.7	63.6
2 x 1 x 1/8	1.78	35.6	53.4	71.2
2 x 1 x 3/16	2.32	46.4	69.6	92.8
2 1/2 x 5/8x3/16	2.27	45.4	68.1	90.8

*Straight Flange.

HOT ROLLED STEEL CHANNELS

Spec. ASTM-A-36 or ASTM-A-7

Stock Lengths 20, 30, 40 and 60 Feet

Depth Inches	Weight Lbs. per Foot	Flange Width Inches	Web Thickness Inches	20-Ft. Length	30-Ft. Length	40-Ft. Length	Approximate Weight, Pounds 60-Ft. Length
STANDARD STRUCTURAL SIZES							
3.....	4.1	1.410	.170	82	123	164	246
3.....	5.0	1.498	.258	100	150	200	300
3.....	6.0	1.596	.356	120	180	240	360
4.....	5.4	1.580	.180	108	162	216	324
4.....	6.25	1.647	.247	125	188	250	375
4.....	7.25	1.720	.320	145	218	290	435
5.....	6.7	1.750	.190	134	201	268	402
5.....	9.0	1.885	.325	180	270	360	540
6.....	8.2	1.920	.200	164	246	328	492
6.....	10.5	2.034	.314	210	315	420	630
6.....	13.0	2.157	.437	260	390	520	780
7.....	9.8	2.090	.210	196	294	392	588
7.....	12.25	2.194	.314	245	368	490	735
7.....	14.75	2.299	.419	295	443	590	885
8.....	11.5	2.260	.220	230	345	460	690
8.....	13.75	2.343	.303	275	413	550	825
8.....	18.75	2.527	.487	375	563	750	1125
9.....	13.4	2.430	.230	268	402	536	804
9.....	15.0	2.485	.285	300	450	600	900
9.....	20.0	2.648	.448	400	600	800	1200
10.....	15.3	2.600	.240	306	459	612	918
10.....	20.0	2.739	.379	400	600	800	1200
10.....	25.0	2.886	.526	500	750	1000	1500
10.....	30.0	3.033	.673	600	900	1200	1800
12.....	20.7	2.940	.280	414	621	828	1242
12.....	25.0	3.047	.387	500	750	1000	1500
12.....	30.0	3.170	.510	600	900	1200	1800
15.....	33.9	3.400	.400	678	1017	1356	2034
15.....	40.0	3.520	.520	800	1200	1600	2400
15.....	50.0	3.716	.716	1000	1500	2000	3000
SHIP AND CAR CHANNELS							
3.....	7.1	1.938	.312	142	213	284	426
3.....	9.0	2.125	.500	180	270	360	540
4.....	13.8	2.500	.500	276	414	552	828
6.....	12.0	2.500	.313	240	360	480	720
6.....	15.1	2.938	.313	302	453	604	906
6.....	15.3	3.500	.340	306	459	612	918
6.....	16.3	3.000	.375	326	489	652	978
6.....	18.0	3.500	.375	360	540	720	1080
7.....	17.6	3.000	.375	352	528	704	1056
7.....	19.1	3.450	.350	382	573	764	1146
8.....	18.7	2.975	.350	374	561	748	1122
8.....	20.0	3.025	.400	400	600	800	1200
8.....	21.4	3.450	.375	428	642	856	1284
8.....	22.8	3.500	.425	456	684	912	1368
9.....	23.9	3.450	.375	478	717	956	1434
9.....	25.4	3.500	.450	508	762	1016	1524

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HOT ROLLED STEEL CHANNELS (Cont.)**Spec. ASTM-A-36 or ASTM-A-7****SHIP AND CAR CHANNELS (Cont.)****Stock Lengths 20, 30, 40 and 60 Feet**

Depth Inches	Weight Lbs. per Foot	Flange Width Inches	Web Thickness Inches	Approximate Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
10.....	21.9.....	3.450.....	.325.....	438.....	657.....	876.....	1314.....
10.....	24.9.....	3.400.....	.375.....	498.....	747.....	996.....	1494.....
10.....	25.3.....	3.550.....	.425.....	506.....	759.....	1012.....	1518.....
10.....	28.5.....	3.950.....	.425.....	570.....	855.....	1140.....	1710.....
10.....	33.6.....	4.100.....	.575.....	672.....	1008.....	1344.....	2016.....
10.....	41.1.....	4.319.....	.794.....	822.....	1233.....	1644.....	2466.....
12.....	30.9.....	3.450.....	.450.....	618.....	927.....	1236.....	1854.....
12.....	32.9.....	3.500.....	.500.....	658.....	987.....	1316.....	1974.....
12.....	35.0.....	3.450.....	.467.....	700.....	1050.....	1400.....	2100.....
12.....	37.0.....	3.600.....	.600.....	740.....	1110.....	1480.....	2220.....
12.....	40.0.....	3.890.....	.590.....	800.....	1200.....	1600.....	2400.....
12.....	45.0.....	4.000.....	.700.....	900.....	1350.....	1800.....	2700.....
12.....	50.0.....	4.135.....	.700.....	1000.....	1500.....	2000.....	3000.....
18.....	42.7.....	3.950.....	.450.....	854.....	1281.....	1708.....	2562.....
18.....	45.8.....	4.000.....	.500.....	916.....	1374.....	1832.....	2748.....
18.....	51.9.....	4.100.....	.600.....	1038.....	1557.....	2076.....	3114.....
18.....	58.0.....	4.200.....	.720.....	1160.....	1740.....	2320.....	3480.....

JUNIOR CHANNELS**Stock Lengths 20, 30 and 40 Feet**

Depth Inches	Weight Lbs. per Foot	Flange Width Inches	Web Thickness Inches	Approximate Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length
10.....	6.5.....	1.125.....	.150.....	130.....	195.....	260.....
10.....	8.4.....	1.500.....	.170.....	168.....	252.....	336.....

HOT ROLLED STEEL BAR SIZE TEES**Spec. ASTM-A-7 or M1020 Merchant Bar Quality****Stock Lengths 20 and 30 Feet**

Flange In.	Stem In.	Thick- ness In.	Per Foot	Approximate Weight, Pounds 20-Ft. Length	30-Ft. Length
3/4 x	3/4 x	1/8.....	.61.....	12.2.....	18.3.....
7/8 x	7/8 x	1/8.....	.73.....	14.6.....	21.9.....
1 x	1 x	1/8.....	.85.....	17.0.....	25.5.....
1 1/4 x	1 1/4 x	1/8.....	1.09.....	21.8.....	32.7.....
		3/16.....	1.55.....	31.0.....	46.5.....
1 1/2 x	1 1/2 x	3/16.....	1.90.....	38.0.....	57.0.....
		1/4.....	2.43.....	48.6.....	72.9.....
2 x	2 x	1/4.....	3.56.....	71.2.....	106.8.....
2 1/2 x	2 1/2 x	1/4.....	4.60.....	92.0.....	138.0.....
		5/16.....	5.50.....	110.0.....	165.0.....
		3/8.....	6.40.....	128.0.....	192.0.....

HOT ROLLED STEEL STRUCTURAL SIZE TEES**Spec. ASTM-A-36 or ASTM-A-7****Stock Lengths 20, 30 and 40 Feet**

Flange In.	Stem In.	Thick- ness In.	Per Foot	Approximate Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length
3 x	2 1/2 x	5/16.....	6.1.....	122.....	183.....	244.....
3 x	3 x	5/16.....	6.7.....	134.....	201.....	268.....
3 x	3 x	3/8.....	7.8.....	156.....	234.....	312.....
4 x	4 x	1/2.....	13.5.....	270.....	405.....	540.....

HOT ROLLED STEEL STANDARD I-BEAMS

Spec. ASTM-A-36 or ASTM-A-7

Stock Lengths 20, 30, 40 and 60 Feet

Depth Inches	Weight Lbs. per Foot	Flange Width Inches	Web Thickness Inches	Approximate Weight, Pounds			
				20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
3.....	5.7.....	2.330.....	.170.....	114.....	171.....	228.....	342.....
3.....	7.5.....	2.509.....	.349.....	150.....	225.....	300.....	450.....
4.....	7.7.....	2.660.....	.190.....	154.....	231.....	308.....	462.....
4.....	9.5.....	2.796.....	.326.....	190.....	285.....	380.....	570.....
5.....	10.0.....	3.000.....	.210.....	200.....	300.....	400.....	600.....
5.....	14.75.....	3.284.....	.494.....	295.....	443.....	590.....	885.....
6.....	12.5.....	3.330.....	.230.....	250.....	375.....	500.....	750.....
6.....	17.25.....	3.565.....	.465.....	345.....	518.....	690.....	1035.....
7.....	15.3.....	3.660.....	.250.....	306.....	459.....	612.....	918.....
7.....	20.0.....	3.860.....	.450.....	400.....	600.....	800.....	1200.....
8.....	18.4.....	4.000.....	.270.....	368.....	552.....	736.....	1104.....
8.....	23.0.....	4.171.....	.441.....	460.....	690.....	920.....	1380.....
10.....	25.4.....	4.660.....	.310.....	508.....	762.....	1016.....	1524.....
10.....	35.0.....	4.944.....	.594.....	700.....	1050.....	1400.....	2100.....
12.....	31.8.....	5.000.....	.350.....	636.....	954.....	1272.....	1908.....
12.....	35.0.....	5.078.....	.428.....	700.....	1050.....	1400.....	2100.....
12.....	40.8.....	5.250.....	.460.....	816.....	1224.....	1632.....	2448.....
12.....	50.0.....	5.477.....	.687.....	1000.....	1500.....	2000.....	3000.....
15.....	42.9.....	5.500.....	.410.....	858.....	1287.....	1716.....	2574.....
15.....	50.0.....	5.640.....	.550.....	1000.....	1500.....	2000.....	3000.....
18.....	54.7.....	6.000.....	.460.....	1094.....	1641.....	2188.....	3282.....
18.....	70.0.....	6.251.....	.711.....	1400.....	2100.....	2800.....	4200.....

HOT ROLLED STEEL STRUCTURAL SECTIONS

STANCHIONS (S) LIGHT BEAMS (LB) JOISTS (J)

JUNIOR BEAMS (JB) H-BEAMS (H)

Spec. ASTM-A-36 or ASTM-A-7

Tensile Strength 60,000 to 72,000 Pounds per Square Inch

Stock Lengths 20, 30, 40 and 60 Feet

Nominal Size Inches	Weight Lbs. per Foot	Type of Section	Depth Inches	Flange Width Inches	Web Thick. Inches	20-Ft. Lgth.	30-Ft. Lgth.	40-Ft. Lgth.	60-Ft. Lgth.
4x 4 ..	13.0 ..	(H) ..	4.00 ..	3.937 ..	.250 ..	260 ..	390 ..	520 ..	780 ..
5x 5 ..	16.0 ..	(S) ..	5.00 ..	5.000 ..	.240 ..	320 ..	480 ..	640 ..	960 ..
5x 5 ..	18.9 ..	(H) ..	5.00 ..	5.000 ..	.313 ..	378 ..	567 ..	756 ..	1134 ..
6x 1 7/8 ..	4.4 ..	(JB) ..	6.00 ..	1.875 ..	.114 ..	88 ..	132 ..	176 ..	..
6x 4 ..	8.5 ..	(J) ..	5.83 ..	3.940 ..	.170 ..	170 ..	255 ..	340 ..	510 ..
6x 4 ..	12.0 ..	(LB) ..	6.00 ..	4.000 ..	.230 ..	240 ..	360 ..	480 ..	720 ..
6x 4 ..	16.0 ..	(LB) ..	6.25 ..	4.030 ..	.260 ..	320 ..	480 ..	640 ..	960 ..
6x 6 ..	15.5 ..	(S) ..	6.00 ..	6.000 ..	.240 ..	310 ..	465 ..	620 ..	930 ..
6x 6 ..	20.0 ..	(H) ..	6.00 ..	5.938 ..	.250 ..	400 ..	600 ..	800 ..	1200 ..
6x 6 ..	22.5 ..	(H) ..	6.00 ..	6.063 ..	.375 ..	450 ..	675 ..	900 ..	1350 ..
6x 6 ..	25.0 ..	(H) ..	6.00 ..	5.938 ..	.313 ..	500 ..	750 ..	1000 ..	1500 ..
8x 2 1/4 ..	6.5 ..	(JB) ..	8.00 ..	2.250 ..	.135 ..	130 ..	195 ..	260 ..	..
8x 4 ..	10.0 ..	(J) ..	7.90 ..	3.940 ..	.170 ..	200 ..	300 ..	400 ..	600 ..
8x 4 ..	13.0 ..	(LB) ..	8.00 ..	4.000 ..	.230 ..	260 ..	390 ..	520 ..	780 ..
8x 4 ..	15.0 ..	(LB) ..	8.12 ..	4.015 ..	.245 ..	300 ..	450 ..	600 ..	900 ..

Continued on Page 248

HOT ROLLED STEEL STRUCTURAL SECTIONS (Cont.)

WIDE FLANGE BEAMS (WF) H-BEAMS (H) JOISTS (J)
JUNIOR BEAMS (JB) LIGHT BEAMS (LB)

Spec. ASTM-A-36 or ASTM-A-7

Tensile Strength 60,000 to 72,000 Pounds per Square Inch

Stock Lengths 20, 30, 40 and 60 Feet

Nominal Size Inches	Weight Lbs. per Foot	Type of Section	Depth Inches	Flange Width Inches	Web Thick. Inches	Approx. Weight, Pounds 20-Ft. Lgth.	30-Ft. Lgth.	40-Ft. Lgth.	60-Ft. Lgth.
8x 5 1/4 ..	17.0 ..	(WF) ..	8.00 ..	5.250 ..	.230 ..	340 ..	510 ..	680 ..	1020
8x 5 1/4 † ..	18.5 ..	(WF) ..	8.00 ..	5.250 ..	.230 ..	370 ..	555 ..	740 ..	1110
8x 5 1/4 ..	20.0 ..	(WF) ..	8.14 ..	5.268 ..	.248 ..	400 ..	600 ..	800 ..	1200
8x 6 1/2 ..	24.0 ..	(WF) ..	7.98 ..	6.500 ..	.245 ..	480 ..	720 ..	960 ..	1440
8x 6 1/2 ..	28.0 ..	(WF) ..	8.06 ..	6.540 ..	.285 ..	560 ..	840 ..	1120 ..	1680
8x 8 ..	31.0 ..	(WF) ..	8.00 ..	8.000 ..	.288 ..	620 ..	930 ..	1240 ..	1860
8x 8 ..	32.6 ..	(H) ..	8.00 ..	7.938 ..	.313 ..	652 ..	978 ..	1304 ..	1956
8x 8 ..	34.3 ..	(H) ..	8.00 ..	8.000 ..	.375 ..	686 ..	1029 ..	1372 ..	2058
8x 8 ..	35.0 ..	(WF) ..	8.12 ..	8.027 ..	.315 ..	700 ..	1050 ..	1400 ..	2100
8x 8 ..	40.0 ..	(WF) ..	8.25 ..	8.077 ..	.365 ..	800 ..	1200 ..	1600 ..	2400
8x 8 ..	48.0 ..	(WF) ..	8.50 ..	8.117 ..	.405 ..	960 ..	1440 ..	1920 ..	2880
8x 8 ..	58.0 ..	(WF) ..	8.75 ..	8.222 ..	.510 ..	1160 ..	1740 ..	2320 ..	3480
8x 8 ..	67.0 ..	(WF) ..	9.00 ..	8.287 ..	.575 ..	1340 ..	2010 ..	2680 ..	4020
10x 2 3/4 ..	9.0 ..	(JB) ..	10.00 ..	2.688 ..	.155 ..	180 ..	270 ..	360 ..	540
10x 4 ..	11.5 ..	(J) ..	9.87 ..	3.950 ..	.180 ..	230 ..	345 ..	460 ..	690
10x 4 ..	15.0 ..	(LB) ..	10.00 ..	4.000 ..	.230 ..	300 ..	450 ..	600 ..	900
10x 4 ..	17.0 ..	(LB) ..	10.12 ..	4.010 ..	.240 ..	340 ..	510 ..	680 ..	1020
10x 4 ..	19.0 ..	(LB) ..	10.25 ..	4.020 ..	.250 ..	380 ..	570 ..	760 ..	1140
10x 5 3/4 ..	21.0 ..	(WF) ..	9.90 ..	5.750 ..	.240 ..	420 ..	630 ..	840 ..	1260
10x 5 3/4 † ..	22.9 ..	(WF) ..	9.875 ..	5.750 ..	.240 ..	458 ..	687 ..	916 ..	1374
10x 5 3/4 ..	25.0 ..	(WF) ..	10.08 ..	5.762 ..	.252 ..	500 ..	750 ..	1000 ..	1500
10x 5 3/4 ..	29.0 ..	(WF) ..	10.22 ..	5.799 ..	.289 ..	580 ..	870 ..	1160 ..	1740
10x 8 ..	33.0 ..	(WF) ..	9.75 ..	7.964 ..	.292 ..	660 ..	990 ..	1320 ..	1980
10x 8 ..	39.0 ..	(WF) ..	9.94 ..	7.990 ..	.318 ..	780 ..	1170 ..	1560 ..	2340
10x 8 ..	45.0 ..	(WF) ..	10.12 ..	8.022 ..	.350 ..	900 ..	1350 ..	1800 ..	2700
10x10 ..	49.0 ..	(WF) ..	10.00 ..	10.000 ..	.340 ..	980 ..	1470 ..	1960 ..	2940
10x10 ..	54.0 ..	(WF) ..	10.12 ..	10.028 ..	.368 ..	1080 ..	1620 ..	2160 ..	3240
10x10 ..	60.0 ..	(WF) ..	10.25 ..	10.075 ..	.415 ..	1200 ..	1800 ..	2400 ..	3600
10x10 ..	66.0 ..	(WF) ..	10.38 ..	10.117 ..	.457 ..	1320 ..	1980 ..	2640 ..	3960
10x10 ..	72.0 ..	(WF) ..	10.50 ..	10.170 ..	.510 ..	1440 ..	2160 ..	2880 ..	4320
10x10 ..	77.0 ..	(WF) ..	10.62 ..	10.195 ..	.535 ..	1540 ..	2310 ..	3080 ..	4620
10x10 ..	100.0 ..	(WF) ..	11.12 ..	10.345 ..	.685 ..	2000 ..	3000 ..	4000 ..	6000
10x10 ..	112.0 ..	(WF) ..	11.38 ..	10.415 ..	.755 ..	2240 ..	3360 ..	4480 ..	6720
12x 3 ..	11.8 ..	(JB) ..	12.00 ..	3.063 ..	.175 ..	236 ..	354 ..	472 ..	708
12x 4 ..	14.0 ..	(J) ..	11.91 ..	3.970 ..	.200 ..	280 ..	420 ..	560 ..	840
12x 4 ..	16.5 ..	(LB) ..	12.00 ..	4.000 ..	.230 ..	330 ..	495 ..	660 ..	990
12x 4 ..	19.0 ..	(LB) ..	12.16 ..	4.100 ..	.240 ..	380 ..	570 ..	760 ..	1140
12x 4 ..	22.0 ..	(LB) ..	12.31 ..	4.030 ..	.260 ..	440 ..	660 ..	880 ..	1320
12x 6 1/2 ..	27.0 ..	(WF) ..	11.96 ..	6.500 ..	.240 ..	540 ..	810 ..	1080 ..	1620
12x 6 1/2 ..	31.0 ..	(WF) ..	12.09 ..	6.525 ..	.265 ..	620 ..	930 ..	1240 ..	1860
12x 6 1/2 ..	36.0 ..	(WF) ..	12.24 ..	6.565 ..	.305 ..	720 ..	1080 ..	1440 ..	2160
12x 8 ..	40.0 ..	(WF) ..	11.94 ..	8.000 ..	.294 ..	800 ..	1200 ..	1600 ..	2400
12x 8 ..	45.0 ..	(WF) ..	12.06 ..	8.042 ..	.336 ..	900 ..	1350 ..	1800 ..	2700
12x 8 ..	50.0 ..	(WF) ..	12.19 ..	8.077 ..	.371 ..	1000 ..	1500 ..	2000 ..	3000
12x10 ..	53.0 ..	(WF) ..	12.06 ..	10.000 ..	.345 ..	1060 ..	1590 ..	2120 ..	3180
12x10 ..	58.0 ..	(WF) ..	12.19 ..	10.014 ..	.359 ..	1160 ..	1740 ..	2320 ..	3480

†Kaiser sections—Flanges have a 6° taper.

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HOT ROLLED STEEL STRUCTURAL SECTIONS (Cont.)

WIDE FLANGE BEAMS — Spec. ASTM-A-36 or ASTM-A-7

Tensile Strength 60,000 to 72,000 Pounds per Square Inch

Stock Lengths 20, 30, 40 and 60 Feet

Nominal Size Inches	Weight Lbs. per Foot	Depth Inches	Flange Width Inches	Web Thick. Inches	Approx. Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
12x12	65.0	12.12	12.000	.390	1300	1950	2600	3900
12x12	72.0	12.25	12.040	.430	1440	2160	2880	4320
12x12	79.0	12.38	12.080	.470	1580	2370	3160	4740
12x12	85.0	12.50	12.105	.495	1700	2550	3400	5100
12x12	92.0	12.62	12.155	.545	1840	2760	3680	5520
12x12	99.0	12.75	12.190	.580	1980	2970	3960	5940
12x12	106.0	12.88	12.230	.620	2120	3180	4240	6360
12x12	133.0	13.38	12.365	.755	2660	3990	5320	7980
12x12	161.0	13.38	12.515	.905	3220	4830	6440	9660
12x12	190.0	14.38	12.670	1.060	3800	5700	7600	11400
14x 6 $\frac{3}{4}$	30.0	13.86	6.733	.270	600	900	1200	1800
14x 6 $\frac{3}{4}$	34.0	14.00	6.750	.287	680	1020	1360	2040
14x 6 $\frac{3}{4}$	38.0	14.12	6.776	.313	760	1140	1520	2280
14x 8	43.0	13.68	8.000	.308	860	1290	1720	2580
14x 8	48.0	13.81	8.031	.339	960	1440	1920	2880
14x 8	53.0	13.94	8.062	.370	1060	1590	2120	3180
14x10	61.0	13.91	10.000	.378	1220	1830	2440	3660
14x10	68.0	14.06	10.040	.418	1360	2040	2720	4080
14x10	74.0	14.19	10.072	.450	1480	2220	2960	4440
14x12	78.0	14.06	12.000	.428	1560	2340	3120	4680
14x12	84.0	14.18	12.023	.451	1680	2520	3360	5040
14x14 $\frac{1}{2}$	87.0	14.00	14.500	.420	1740	2610	3480	5220
14x14 $\frac{1}{2}$	95.0	14.12	14.545	.465	1900	2850	3800	5700
14x14 $\frac{1}{2}$	103.0	14.25	14.575	.495	2060	3090	4120	6180
14x14 $\frac{1}{2}$	111.0	14.37	14.620	.540	2220	3330	4440	6660
14x14 $\frac{1}{2}$	127.0	14.62	14.690	.610	2540	3810	5080	7620
14x14 $\frac{1}{2}$	136.0	14.75	14.740	.660	2720	4080	5440	8160
14x16	142.0	14.75	15.500	.680	2840	4260	5680	8520
14x16	150.0	14.88	15.515	.695	3000	4500	6000	9000
14x16	167.0	15.12	15.600	.780	3340	5010	6680	10020
14x16	193.0	15.50	15.710	.890	3860	5790	7720	11580
14x16	202.0	15.63	15.750	.930	4040	6060	8080	12120
14x16	228.0	16.00	15.865	1.045	4560	6840	9120	13680
14x16	237.0	16.12	15.910	1.090	4740	7110	9480	14220
16x 7	36.0	15.85	6.992	.299	720	1080	1440	2160
16x 7	40.0	16.00	7.000	.307	800	1200	1600	2400
16x 7	45.0	16.12	7.039	.346	900	1350	1800	2700
16x 7	50.0	16.25	7.073	.380	1000	1500	2000	3000
16x 8 $\frac{1}{2}$	58.0	15.86	8.464	.407	1160	1740	2320	3480
16x 8 $\frac{1}{2}$	64.0	16.00	8.500	.443	1280	1920	2560	3840
16x 8 $\frac{1}{2}$	71.0	16.16	8.543	.486	1420	2130	2840	4260
16x 8 $\frac{1}{2}$	78.0	16.32	8.586	.529	1560	2340	3120	4680
16x11 $\frac{1}{2}$	88.0	16.16	11.502	.504	1760	2640	3520	5280
16x11 $\frac{1}{2}$	96.0	16.32	11.533	.535	1920	2880	3840	5760
18x 7 $\frac{1}{2}$	50.0	18.00	7.500	.358	1000	1500	2000	3000
18x 7 $\frac{1}{2}$	55.0	18.12	7.532	.390	1100	1650	2200	3300
18x 7 $\frac{1}{2}$	60.0	18.25	7.558	.416	1200	1800	2400	3600

HOT ROLLED STEEL STRUCTURAL SECTIONS (Cont.)**WIDE FLANGE BEAMS — Spec. ASTM-A-36 or ASTM-A-7**

Tensile Strength 60,000 to 72,000 Pounds per Square Inch

Stock Lengths 20, 30, 40 and 60 Feet

Nominal Size Inches	Weight Lbs. per Foot	Depth Inches	Flange Width Inches	Web Thick. Inches	Approx. Weight, Pounds 20-Ft. Length	30-Ft. Length	40-Ft. Length	60-Ft. Length
18x 8 3/4	64.0	17.87	8.715	.403	1280	1920	2560	3840
18x 8 3/4	70.0	18.00	8.750	.438	1400	2100	2800	4200
18x 8 3/4	85.0	18.32	8.838	.526	1700	2550	3400	5100
18x11 1/4	105.0	18.32	11.792	.554	2100	3150	4200	6300
18x11 1/4	114.0	18.48	11.833	.595	2280	3420	4560	6840
21x 8 1/4	62.0	20.99	8.240	.400	1240	1860	2480	3720
21x 8 1/4	68.0	21.13	8.270	.430	1360	2040	2720	4080
21x 8 1/4	73.0	21.24	8.295	.455	1460	2190	2920	4380
21x 9	82.0	20.86	8.962	.499	1640	2460	3280	4920
21x 9	96.0	21.14	9.038	.575	1920	2880	3840	5760
21x13	112.0	21.00	13.000	.527	2240	3360	4480	6720
21x13	127.0	21.24	13.061	.588	2540	3810	5080	7620
21x13	142.0	21.46	13.132	.659	2840	4260	5680	8520
24x 9	76.0	23.91	8.985	.440	1520	2280	3040	4560
24x 9	84.0	24.09	9.015	.470	1680	2520	3360	5040
24x 9	94.0	24.29	9.061	.516	1880	2820	3760	5640
24x12	100.0	24.00	12.000	.468	2000	3000	4000	6000
24x12	120.0	24.31	12.088	.556	2400	3600	4800	7200
24x14	145.0	24.49	14.043	.608	2900	4350	5800	8700
24x14	160.0	24.72	14.091	.656	3200	4800	6400	9600
27x10	94.0	26.91	9.990	.490	1880	2820	3760	5640
27x10	102.0	27.07	10.018	.518	2040	3060	4080	6120
27x10	114.0	27.28	10.070	.570	2280	3420	4560	6840
27x14	145.0	26.88	13.965	.600	2900	4350	5800	8700
27x14	160.0	27.08	14.023	.658	3200	4800	6400	9600
27x14	177.0	27.31	14.090	.725	3540	5310	7080	10620
30x10 1/2	108.0	29.82	10.484	.548	2160	3240	4320	6480
30x10 1/2	116.0	30.00	10.500	.564	2320	3480	4640	6960
30x10 1/2	124.0	30.16	10.521	.585	2480	3720	4960	7440
30x10 1/2	132.0	30.30	10.551	.615	2640	3960	5280	7920
30x15	172.0	29.88	14.985	.655	3440	5160	6880	10320
30x15	190.0	30.12	15.040	.710	3800	5700	7600	11400
30x15	210.0	30.38	15.105	.775	4200	6300	8400	12600
33x11 1/2	130.0	33.10	11.510	.580	2600	3900	5200	7800
33x11 1/2	141.0	33.31	11.535	.605	2820	4230	5640	8460
33x11 1/2	152.0	33.50	11.565	.635	3040	4560	6080	9120
33x15 1/4	220.0	33.25	15.810	.775	4400	6600	8800	13200
33x15 1/4	240.0	33.50	15.865	.830	4800	7200	9600	14400
36x12	150.0	35.84	11.972	.625	3000	4500	6000	9000
36x12	160.0	36.00	12.000	.653	3200	4800	6400	9600
36x12	182.0	36.32	12.072	.725	3640	5460	7280	10920
36x16 1/2	230.0	35.88	16.475	.765	4600	6900	9200	13800
36x16 1/2	245.0	36.06	16.512	.802	4900	7350	9800	14700
36x16 1/2	260.0	36.24	16.555	.845	5200	7800	10400	15600
36x16 1/2	280.0	36.50	16.595	.885	5600	8400	11200	16800
36x16 1/2	300.0	36.72	16.655	.945	6000	9000	12000	18000

Types and sizes listed are standard, established by the U.S. Department of Commerce in its Simplified Practice Recommendation R222-46, effective June 30, 1946 and adopted by the American Iron and Steel Institute, and leaders in the industry. The material shown consists of only those sizes that are carried in our stock.

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METALLURGICAL AND ENGINEERING DATA

**Section of our General Catalog Separately Bound —
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Contains**STAINLESS STEEL**

- Types — Specifications
- Properties — Tolerances
- Fabrication Recommendations
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- Specifications — Weights

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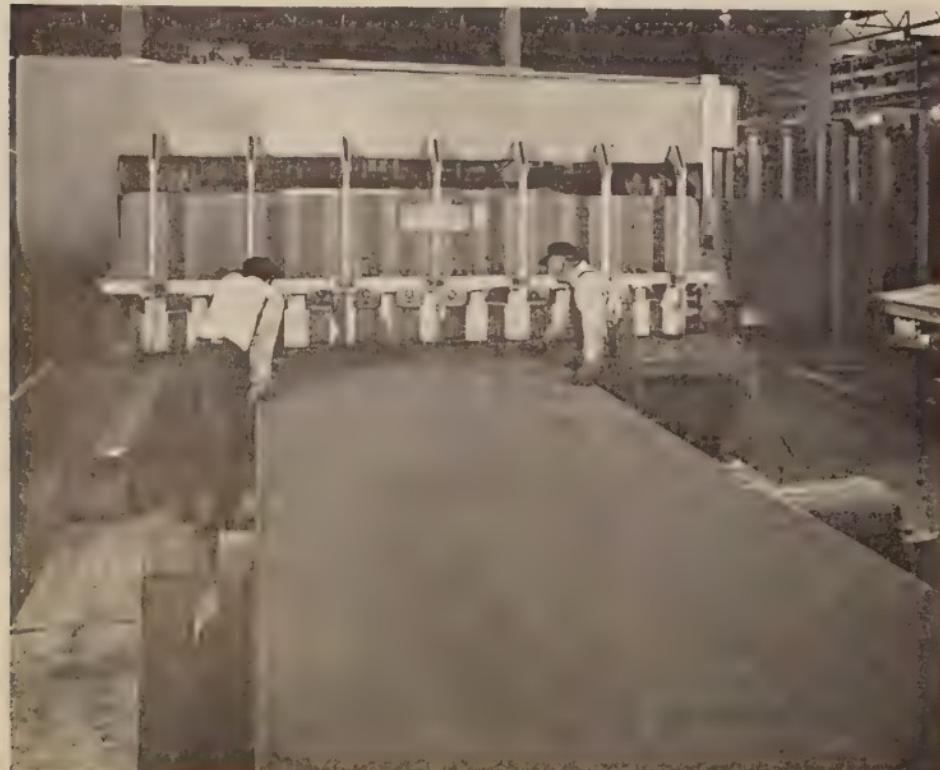
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Weights, Measures & Equivalents

CUTTING TOLERANCES

We are equipped to cut material to precision tolerances. We would like to discuss your cutting tolerance problems with you, especially on cutting of a special nature.



FRICTION SAW
For Cutting Structural Shapes



3/4 Inch by 12 Foot Plate Shear

DEFINITIONS RELATING TO METALS AND METALWORKING

We are indebted to the American Society for Metals for the following definitions, which are from their *Metals Handbook*, 8th Edition, Vol. 1

ACID EMBRITTLEMENT. A form of hydrogen embrittlement which may be induced in some metals by acid treatment.

AGE HARDENING. Hardening by aging, usually after rapid cooling or cold working.

ALCLAD. Composite sheet produced by bonding either corrosion-resistant aluminum alloy or aluminum of high purity to base metal of structural aluminum alloy.

ALLOYING ELEMENT. An element added to a metal to effect changes in properties, and which remains within the metal.

ANNEALING. Heating to and holding at a suitable temperature and then cooling at a suitable rate, for such purposes as reducing hardness, improving machinability, facilitating cold working, producing a desired microstructure, or obtaining desired mechanical, physical or other properties. When applicable, the following more specific terms should be used:

black annealing	intermediate annealing
blue annealing	isothermal annealing
box annealing	malleablizing
bright annealing	process annealing
flame annealing	quench annealing
full annealing	recrystallization annealing
graphitizing	spherodizing

When applied to ferrous alloys, the term "annealing," without qualification, implies full annealing. When applied to nonferrous alloys, the term "annealing" implies a heat treatment designed to soften a cold worked structure by recrystallization or subsequent grain growth or to soften an age hardened alloy by causing a nearly complete precipitation of the second phase in relatively coarse form. Any process of annealing will usually reduce stresses, but if the treatment is applied for the sole purpose of such relief, it should be designated as "stress relieving."

ANODE COPPER. Special-shaped copper slabs, resulting from the refinement of blister copper in a reverberatory furnace, used as anodes in electrolytic refinement.

ANODIC COATING. A film on work resulting from an electrolytic treatment at the anode.

ANODIZING. Forming a conversion coating on a metal surface by anodic oxidation; most frequently applied to aluminum.

ARTIFICIAL AGING. Aging above room temperature.

AUSTEMPERING. Quenching a ferrous alloy from a temperature above the transformation range, in a medium having a rate of heat abstraction high enough to prevent the formation of high-temperature transformation products, and then holding the alloy, until transformation is complete, at a temperature below that of pearlite formation and above that of martensite formation.

AUSTENITE. A solution of one or more elements in face-centered cubic iron. Unless otherwise designated (such as nickel austenite), the solute is generally assumed to be carbon.

BANDED STRUCTURE. A segregated structure of nearly parallel bands aligned in the direction of working.

BEND RADIUS. The inside radius of a bent section.

BEND TEST. A test for determining relative ductility of metal that is to be formed, usually sheet, strip, plate or wire, and for determining soundness and toughness of metal. The specimen is usually bent over a specified diameter through a specified angle for a specified number of cycles.

BESSEMER PROCESS. A process for making steel by blowing air through molten pig iron contained in a refractory lined vessel so as to remove by oxidation most of the carbon, silicon and manganese.

BILLET. A solid semifinished round or square product that has been hot worked by forging, rolling or extrusion. An iron or steel billet has a minimum width or thickness of $1\frac{1}{2}$ inches and the cross-sectional area varies from $2\frac{1}{4}$ to 36 square inches. For nonferrous metals, it may also be a casting suitable for finished or semifinished rolling or for extrusion.

DEFINITIONS RELATING TO METALS AND METALWORKING

BLOOM. A semifinished hot rolled product, rectangular in cross section, produced on a blooming mill. For iron and steel, the width is not more than twice the thickness, and the cross-sectional area is usually not less than 36 square inches. Iron and steel blooms are sometimes made by forging.

BLOWHOLE. A hole in a casting or a weld caused by gas entrapped during solidification.

BLUE BRITTLENESS. Brittleness exhibited by some steels after being heated to some temperature within the range of 300 to 650°F., and more especially if the steel is worked at the elevated temperature. Killed steels are virtually free of this kind of brittleness.

BLUING. Subjecting the scale-free surface of a ferrous alloy to the action of air, steam, or other agents at a suitable temperature, thus forming a thin blue film of oxide and improving the appearance and resistance to corrosion.

NOTE: This term is ordinarily applied to sheet, strip or finished parts. It is used also to denote the heating of springs after fabrication in order to improve their properties.

BRIGHT ANNEALING. Annealing in a protective medium to prevent discoloration of the bright surface.

BRINELL HARDNESS TEST. A test for determining the hardness of a material by forcing a hard steel or carbide ball of specified diameter into it under a specified load. The result is expressed as the Brinell hardness number, which is the value obtained by dividing the applied load in kilograms by the surface area of the resulting impression in square millimeters.

BURNING. (1) Permanently damaging a metal or alloy by heating to cause either incipient melting or intergranular oxidation. (2) In grinding, getting the work hot enough to cause discoloration or to change the microstructure by tempering or hardening.

CARBON STEEL. Steel containing carbon up to about 2% and only residual quantities of other elements except those added for deoxidation, with silicon usually limited to 0.60% and manganese to about 1.65%. Also termed "ordinary steel," "straight carbon steel," "plain carbon steel."

CARBURIZING. Introducing carbon into a solid ferrous alloy by holding above A_c in contact with a suitable carbonaceous material, which may be a solid, liquid or gas. The carburized alloy is usually quench hardened.

CASE. In a ferrous alloy, the outer portion that has been made harder than the inner portion, or core, by case hardening.

CASE HARDENING. Hardening a ferrous alloy so that the outer portion, or case, is made substantially harder than the inner portion or core. Typical processes used for case hardening are carburizing, cyaniding, carbonitriding, nitriding, induction hardening and flame hardening.

CENTRIFUGAL CASTING. A casting made by pouring metal into a mold that is rotated or revolved.

CARPY TEST. A pendulum-type single-blow impact test in which a specimen, usually notched, is supported at both ends as a simple beam and broken by a falling pendulum. The energy absorbed, as determined by the subsequent rise of the pendulum, is a measure of impact strength or notch toughness.

COLD WORK. Permanent strain produced by an external force in a metal below its recrystallization temperature.

CREEP. Time-dependent strain occurring under stress. The creep strain occurring at a diminishing rate is called primary creep; that occurring at a minimum and almost constant rate, secondary creep; that occurring at an accelerating rate, tertiary creep.

CRITICAL POINT. (1) The temperature or pressure at which a change in crystal structure, phase or physical properties occurs. Same as transformation temperature. (2) In an equilibrium diagram, that specific value of composition, temperature and pressure, or combinations thereof, at which the phases of a heterogeneous system are in equilibrium.

CYANIDING. Introducing carbon and nitrogen into a solid ferrous alloy by holding above A_c in contact with molten cyanide of suitable composition. The cyanided alloy is usually quench hardened.

DEFINITIONS RELATING TO METALS AND METALWORKING

DECARBURIZATION. Loss of carbon from surface of a ferrous alloy as a result of heating in a medium that reacts with carbon at the surface.

DEOXIDIZING. (1) The removal of oxygen from molten metals by use of suitable deoxidizers. (2) Sometimes refers to the removal of undesirable elements other than oxygen by the introduction of elements or compounds that readily react with them. (3) In metal finishing, the removal of oxide films from metal surfaces by chemical or electrochemical reaction.

DEZINCIFICATION. Corrosion of some copper-zinc alloys involving loss of zinc and the formation of a spongy porous copper.

DRAWING. (1) Forming recessed parts by forcing the plastic flow of metal in dies. (2) Reducing the cross section of wire or tubing by pulling it through a die. (3) A misnomer for tempering.

DUCTILITY. The ability of a material to deform plastically without fracturing, being measured by elongation or reduction of area in a tensile test, by height of cupping in an Erickson test or by other means.

DYE PENETRANT. Penetrant with dye added to make it more readily visible under normal lighting conditions.

ELASTIC LIMIT. Maximum stress to which material may be subjected without any permanent strain remaining upon complete release of stress.

ELECTROLYTIC COPPER. Copper which has been refined by electrolytic deposition, including cathodes which are the direct product of the refining operation, refinery shapes cast from melted cathodes, and, by extension, fabricators' products made therefrom. Usually when this term is used alone, it refers to electrolytic tough pitch copper without elements other than oxygen being present in significant amounts.

ELONGATION. In tensile testing, the increase in the gage length, measured after fracture of the specimen within the gage length, usually expressed as a percentage of the original gage length.

EROSION. Destruction of metals or other materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles or matter in suspension. When corrosion occurs simultaneously, the term erosion-corrosion is often used.

EXTRUSION. Conversion of a billet into lengths of uniform cross section by forcing the plastic metal through a die orifice of the desired cross-sectional outline. In "direct extrusion," the die and ram are at opposite ends of the billet, and the product and ram travel in the same direction. The UGINE-Sejournet process for steel. In "indirect extrusion" (rare), the die is at the ram end of the billet and the product travels through and in the opposite direction to the hollow ram. A "stepped extrusion" is a single product with one or more abrupt cross-section changes and is obtained by interrupting the extrusion by die changes. "Impact extrusion" (cold extrusion) is the process or resultant product of a punch striking an unheated slug in a confining die. The metal flow may be either between the punch and die or through another opening. Also Hooker process, which uses a pierced slug. "Hot extrusion" is similar to cold extrusion except that a preheated slug is used and the pressure application is slower.

FATIGUE. The phenomenon leading to fracture under repeated or fluctuating stresses having a maximum value less than the tensile strength of the material. Fatigue fractures are progressive, beginning as minute cracks that grow under the action of the fluctuating stress.

FERRITE. (1) A solid solution of one or more elements in body-centered cubic iron. Unless otherwise designated (for instance, as chromium ferrite), the solute is generally assumed to be carbon. On some equilibrium diagrams there are two ferrite regions separated by an austenite area. The lower area is alpha ferrite; the upper, delta ferrite. If there is no designation, alpha ferrite is assumed. (2) In the field of magnetics, substances having the general formula: $M^{++}O \cdot M_2^{+++}O_3$, the trivalent metal often being iron.

FLAKES. Short discontinuous internal fissures in ferrous metals attributed to stresses produced by localized transformation and decreased solubility of hydrogen during cooling after hot working. In a fractured surface, flakes appear as bright silvery areas; on an etched surface they appear as short discontinuous cracks. Also called "shatter cracks" and "snowflakes."

DEFINITIONS RELATING TO METALS AND METALWORKING

FLAME HARDENING. Quench hardening in which the heat is applied directly by a flame.

FLANGE. (1) The projecting annular rim around a cylinder, used for strengthening, fastening or positioning. (2) A circular metal plate that drives a grinding wheel.

FLARING. (1) Forming an outward acute-angle flange on a tubular part. (2) Forming a flange by using the head of a hydraulic press.

FULL ANNEALING. Annealing a ferrous alloy by austenitizing and then cooling slowly through the transformation range. The austenitizing temperature for hypoeutectoid steel is usually Ac_3 ; and for hypereutectoid steel, usually between Ac_1 and Ac_{cm} .

GALLING. Developing a condition on the rubbing surface of one or both mating parts where excessive friction between high spots results in localized welding with subsequent spalling and a further roughening of the surface.

GRAIN SIZE. (1) For metals, a measure of the areas or volumes of grains in a polycrystalline material, usually expressed as an average when the individual sizes are fairly uniform. Grain sizes are reported in terms of number of grains per unit area or volume, average diameter, or as a grain-size number derived from area measurements. (2) For grinding wheels, preferred term, grit size.

HARD DRAWN. Temper of copper or copper alloy tubing drawn in excess of 25% reduction in area.

HARDENABILITY. In a ferrous alloy, the property that determines the depth and distribution of hardness induced by quenching.

HEAT TREATMENT. Heating and cooling a solid metal or alloy in such a way as to obtain desired conditions or properties. Heating for the sole purpose of hot working is excluded from the meaning of this definition.

INCLUSIONS. Nonmetallic materials in a solid metallic matrix.

INGOT. A casting suitable for working or remelting.

IZOD TEST. A pendulum type of single-blow impact test in which the specimen, usually notched, is fixed at one end and broken by a falling pendulum. The energy absorbed, as measured by the subsequent rise of the pendulum, is a measure of impact strength or notch toughness.

KILLED STEEL. Steel deoxidized with a strong deoxidizing agent such as silicon or aluminum in order to reduce the oxygen content to such a level that no reaction occurs between carbon and oxygen during solidification.

LAMINATIONS. Metal defects with separation or weakness generally aligned parallel to the worked surface of the metal. May be the result of pipe, blisters, seams, inclusions or segregation elongated and made directional by working. Lamination defects may also occur in metal-powder compacts.

LAP. A surface defect, appearing as a seam, caused by folding over hot metal, fins or sharp corners and then rolling or forging them into the surface, but not welding them.

MACRO-ETCH. Etching of a metal surface for accentuation of gross structural details and defects for observation by the unaided eye or at magnifications not exceeding ten diameters.

MARTENSITE. (1) In an alloy, a metastable transitional structure intermediate between two allotropic modifications whose abilities to dissolve a given solute differ considerably, the high-temperature phase having the greater solubility. The amount of the high-temperature phase transformed to martensite depends to a large extent upon the temperature attained in cooling, there being a rather distinct beginning temperature. (2) A metastable phase of steel, formed by a transformation of austenite below the Ms (or Ar'') temperature. It is an interstitial supersaturated solid solution of carbon in iron having a body-centered tetragonal lattice. Its microstructure is characterized by an acicular, or needlelike, pattern.

MECHANICAL PROPERTIES. The properties of a material that reveal its elastic and inelastic behavior where force is applied, thereby indicating its suitability for mechanical applications; for example, modulus of elasticity, tensile strength, elongation, hardness and fatigue limit.

MICROSTRUCTURE. The structure of polished and etched metals as revealed by a microscope at a magnification greater than ten diameters.

DEFINITIONS RELATING TO METALS AND METALWORKING

MODULUS OF ELASTICITY. A measure of the rigidity of metal. Ratio of stress, within proportional limit, to corresponding strain. Specifically, the modulus obtained in tension or compression is Young's modulus, stretch modulus or modulus of extensibility; the modulus obtained in torsion or shear is modulus of rigidity, shear modulus or modulus of torsion; the modulus covering the ratio of the mean normal stress to the change in volume per unit volume is the bulk modulus. The tangent modulus and secant modulus are not restricted within the proportional limit; the former is the slope of the stress-strain curve at a specified point; the latter is the slope of a line from the origin to a specified point on the stress-strain curve. Also called "elastic modulus" and "coefficient of elasticity."

NITRIDING. Introducing nitrogen into a solid ferrous alloy by holding at a suitable temperature (below Ac_1 for ferritic steels) in contact with a nitrogenous material, usually ammonia or molten cyanide of appropriate composition. Quenching is not required to produce a hard case.

NORMALIZING. Heating a ferrous alloy to a suitable temperature above the transformation range and then cooling in air to a temperature substantially below the transformation range.

OPEN-HEARTH FURNACE. Reverberatory melting furnace with shallow hearth and low roof. Flame passes over charge on the hearth, causing the charge to be heated both by direct flame and by radiation from roof and sidewalls of the furnace. In ferrous industry, furnace is regenerative.

ORANGE-PEEL EFFECT. A surface roughening in the form of a grain pattern where a metal of unusually coarse grain is stressed beyond its elastic limit. Also called pebbles and alligator skin.

OXYGEN-FREE COPPER. Electrolytic copper free from cuprous oxide, produced without the use of residual metallic or metalloidal deoxidizers.

PERMEABILITY. (1) Foundry. The characteristics of molding materials which permit gases to pass through them. "Permeability number" is determined by a standard test. (2) Powd met. A property measured as the rate of passage under specified conditions of a liquid or gas through a compact. (3) Magnetism. A general term used to express various relationships between magnetic induction and magnetizing force. These relationships are either "absolute permeability," which is the quotient of a change in magnetic induction divided by the corresponding change in magnetizing force, or "specific (relative) permeability," the ratio of the absolute permeability to the permeability of free space.

PHYSICAL PROPERTIES. The properties, other than mechanical properties, that pertain to the physics of a material; for example, density, electrical conductivity, heat conductivity, thermal expansion.

PICKLING. Removing surface oxides from metals by chemical or electrochemical reaction.

PIPE. (1) The central cavity formed by contraction in metal, especially ingots, during solidification. (2) The defect in wrought or cast products resulting from such a cavity. (3) An extrusion defect due to the oxidized surface of the billet flowing toward the center of the rod at the back end. (4) A tubular metal product, cast or wrought.

POROSITY. Fine holes or pores within a metal.

POSTHEATING. Heating weldments immediately after welding, for tempering, for stress relieving, or for providing a controlled rate of cooling to prevent formation of a hard or brittle structure.

PRECIPITATION HARDENING. Hardening caused by the precipitation of a constituent form a supersaturated solid solution.

PREHEATING. Heating before some further thermal or mechanical treatment. For tool steel, heating to intermediate temperature immediately before final austenitizing. For some nonferrous alloys, heating to high temperature for long time, in order to homogenize structure before working.

PROOF STRESS. (1) The stress that will cause a specified small permanent set in a material. (2) A specified stress to be applied to a member or structure to indicate its ability to withstand service loads.

QUENCH HARDENING. Hardening ferrous alloy by austenitizing and then cooling rapidly enough so that some or all of austenite transforms to martensite. Austenitizing temperature for hypoeutectoid steels is usually above Ac_3 and for hypereutectoid steels usually between Ac_1 and Ac_{cm} .

DEFINITIONS RELATING TO METALS AND METALWORKING

RECRYSTALLIZATION. (1) The change from one crystal structure to another, as occurs on heating or cooling through a critical temperature.

(2) The formation of a new, strain-free grain structure from that existing in cold worked metal, usually accomplished by heating.

REDUCTION OF AREA. (1) Commonly, the difference, expressed as a percentage of original area, between the original cross-sectional area of a tensile test specimen and the minimum cross-sectional area measured after complete separation. (2) The difference, expressed as a percentage of original area, between original cross-sectional area and that after straining the specimen.

RIMMED STEEL. A low-carbon steel containing sufficient iron oxide to give a continuous evolution of carbon monoxide while the ingot is solidifying, resulting in a case or rim of metal virtually free of voids. Sheet and strip products made from the ingot have very good surface quality.

ROCKWELL HARDNESS TEST. A test for determining the hardness of a material based upon the depth of penetration of a specified penetrator into the specimen under certain arbitrarily fixed conditions of test.

SALT FOG TEST. An accelerated corrosion test in which specimens are exposed to a fine mist of a solution usually containing sodium chloride but sometimes modified with other chemicals.

SALT SPRAY TEST. More properly, salt fog test.

SCALING. (1) Forming a thick layer of oxidation products on metals at high temperatures. (2) Depositing water-insoluble constituents on a metal surface, as in cooling tubes and water boilers.

SCREW STOCK. Free machining bar, rod or wire.

SEAM. (1) On the surface of metal, an unwelded fold or lap which appears on a crack, usually resulting from a defect obtained in casting or in working. (2) Mechanical or welded joints.

SEASON CRACKING. Cracking resulting from the combined effects of corrosion and internal stress. A term usually applied to stress-corrosion cracking of brass.

SEGREGATION. Nonuniform distribution of alloying elements, impurities or microphases.

SEMIKILLED STEEL. Steel that is incompletely deoxidized and contains sufficient dissolved oxygen to react with the carbon to form carbon monoxide to offset solidification shrinkage.

SKIN. A thin outside metal layer, not formed by bonding as in cladding or electroplating, that differs in composition, structure or other characteristic from the main mass of metal.

SOLUTION HEAT TREATMENT. Heating an alloy to a suitable temperature, holding at that temperature long enough to allow one or more constituents to enter into solid solution, and then cooling rapidly enough to hold the constituents in solution. The alloy is left in a supersaturated, unstable state and may subsequently exhibit quench aging.

SPHEROIDIZING. Heating and cooling to produce a spheroidal or globular form of carbide in steel. Spheroidizing methods frequently used are:

1. Prolonged holding at a temperature just below Ae_1 .
2. Heating and cooling alternately between temperatures that are just above and just below Ae_1 .
3. Heating to a temperature above Ae_1 or Ae_3 and then cooling very slowly in the furnace or holding at a temperature just below Ae_1 .
4. Cooling at a suitable rate from the minimum temperature at which all carbide is dissolved, to prevent the reformation of a carbide network, and then reheating in accordance with methods 1 or 2 above. (Applicable to hypereutectoid steel containing a carbide network.)

STABILIZING TREATMENT. Any treatment intended to stabilize the structure of an alloy or the dimensions of a part. (1) Heating austenitic stainless steels that contain titanium, columbium or tantalum to a suitable temperature below that of a full anneal in order to deactivate the maximum amount of carbon by precipitation as a carbide of titanium, columbium or tantalum. (2) Transforming retained austenite in parts made from tool steel. (3) Precipitating a constituent from a nonferrous solid solution to improve the workability, to decrease the tendency of certain alloys to age harden at room temperature or to obtain dimensional stability.

DEFINITIONS RELATING TO METALS AND METALWORKING

STRESS RELIEVING. Heating to a suitable temperature, holding long enough to reduce residual stresses and then cooling slowly enough to minimize the development of new residual stresses.

STRETCHER LEVELING. Leveling where a piece of metal is gripped at each end and subjected to a stress higher than its yield strength to remove warp and distortion. Sometimes called patent leveling.

SWAGING. Forming a taper or a reduction on metal products such as rod and tubing by forging, squeezing or hammering.

TEMPER. (1) In heat treatment, reheating hardened steel or cast iron to some temperature below the eutectoid temperature for the purpose of decreasing the hardness and increasing the toughness. The process also is sometimes applied to normalized steel. (2) In tool steels "temper" is sometimes used, but inadvisedly, to denote the carbon content. (3) In nonferrous alloys and in some ferrous alloys (steels that cannot be hardened by heat treatment), the hardness and strength produced by mechanical or thermal treatment, or both, and characterized by a certain structure, mechanical properties, or reduction in area during cold working.

TEMPER BRITTLENESS. Brittleness that results when certain steels are held within, or are cooled slowly through, a certain range of temperature below the transformation range. The brittleness is revealed by notched-bar impact tests at or below room temperature.

TEMPERING. Preheating a quench-hardened or normalized ferrous alloy to a temperature below the transformation range and then cooling at any rate desired.

TENSILE STRENGTH. In tensile testing, the ratio of maximum load to original load to original cross-sectional area. Also called ultimate strength.

TOLERANCE. The specified permissible deviation from a specified nominal dimension, or the permissible variation in size of a part.

TOUGH PITCH COPPER. Copper containing from 0.02 to 0.05% O, obtained by refining copper in a reverberatory furnace.

TRANSFORMATION RANGES (Transformation temperature ranges). Those ranges of temperature within which austenite forms during heating and transforms during cooling. The two ranges are distinct, sometimes overlapping but never coinciding. The limiting temperatures of the ranges depend on the composition of the alloy and on the rate of change of temperature, particularly during cooling.

TUMBLING. An operation where the work, usually castings or forgings, is rotated in a barrel with metal slugs or abrasives to remove sand, scale or fins. It may be done dry or with aqueous solution. Sometimes called tumbling or rattling.

WELDING. (1) Joining two or more pieces of material by applying heat, pressure or both, with or without filler material, to produce a localized union through fusion or recrystallization across the interface. The thickness of the filler material is much greater than the capillary dimensions encountered in brazing. (2) May also be extended to include brazing.

WELDING STRESS. Residual stress caused by localized heating and cooling during welding.

WHITE METAL. (1) A general term covering a group of white-colored metals of relatively low melting points (lead, antimony, bismuth, tin, cadmium and zinc) and of the alloys based on these metals. (2) A copper matte of about 77% Cu obtained from the smelting of sulfide copper ores.

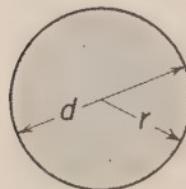
X-RAY. Electromagnetic radiation, of wave length less than about 500 Angstrom units, emitted as the result of deceleration of fast-moving electrons (brems-strahlung, continuous spectrum) or decay of atomic electrons from excited orbital states (characteristics radiation); specifically, the radiation produced when an electron beam of sufficient energy impinges upon a target of suitable material.

YIELD POINT. The first stress in a material, usually less than the maximum attainable stress, at which an increase in strain occurs without an increase in stress. Only certain metals exhibit a yield point. If there is a decrease in stress after yielding, a distinction may be made between upper and lower yield points.

YIELD STRENGTH. The stress at which a material exhibits a specified deviation from proportionality of stress to strain. An offset of 0.2% is used for many metals.

MATHEMATICAL FORMULAS

In the following formulas the letter "A" is used to designate the shaded area of the figure in all cases.



Circle

$$A = \text{area}; \quad C = \text{circumference}.$$

$$A = \pi r^2 = 3.1416 r^2 = 0.7854 d^2$$

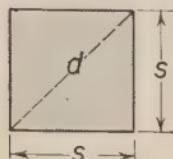
$$C = 2\pi r = 6.2832 r = 3.1416 d$$

$$r = C \div 6.2832 = \sqrt{A \div 3.1416} = 0.564 \sqrt{A}$$

$$d = C \div 3.1416 = \sqrt{A \div 0.7854} = 1.128 \sqrt{A}$$

$$\text{Length of arc for center-angle of } 1^\circ = 0.008727 d$$

$$\text{Length of arc for center-angle of } n^\circ = 0.008727 n d$$

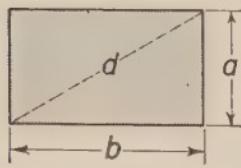


Square

$$A = \frac{1}{2} d^2$$

$$s = 0.7071 d = \sqrt{A}$$

$$d = 1.414 s = 1.414 \sqrt{A}$$



Rectangle

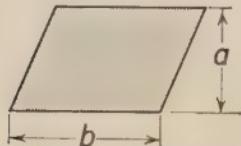
$$A = ab$$

$$A = a \sqrt{d^2 - a^2} = b \sqrt{d^2 - b^2}$$

$$d = \sqrt{a^2 + b^2}$$

$$a = \sqrt{d^2 - b^2} = A \div b$$

$$b = \sqrt{d^2 - a^2} = A \div a$$



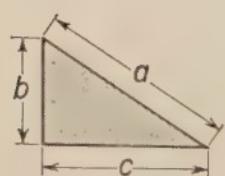
Parallelogram

$$A = ab$$

$$a = A \div b$$

$$b = A \div a$$

Note that dimension a is measured at right angles to line b .



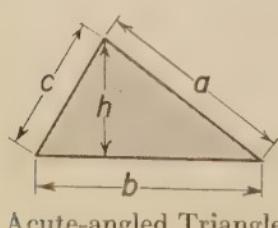
Right-angled Triangle

$$A = \frac{bc}{2}$$

$$a = \sqrt{b^2 + c^2}$$

$$b = \sqrt{a^2 - c^2}$$

$$c = \sqrt{a^2 - b^2}$$



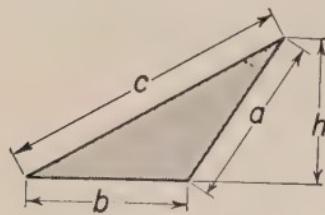
Acute-angled Triangle

$$A = \frac{bh}{2} = \frac{b}{2} \sqrt{a^2 - \left(\frac{a^2 + b^2 - c^2}{2b} \right)^2}$$

If $S = \frac{1}{2} (a+b+c)$, then

$$A = \sqrt{S(S-a)(S-b)(S-c)}$$

MATHEMATICAL FORMULAS (Cont.)

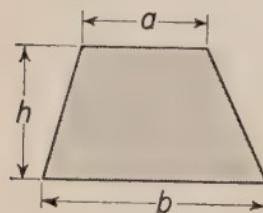


Obtuse-angled Triangle

$$A = \frac{bh}{2} = \frac{b}{2} \sqrt{a^2 - \left(\frac{c^2 - a^2 - b^2}{2b} \right)^2}$$

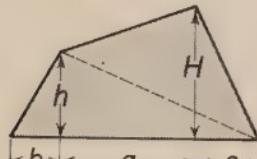
If $S = \frac{1}{2} (a+b+c)$, then

$$A = \sqrt{S(S-a)(S-b)(S-c)}$$



Trapezeoid

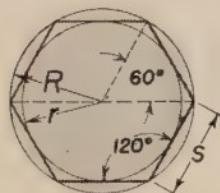
$$A = \frac{(a+b)h}{2}$$



Trapezium

$$A = \frac{(H+h)a + bh + cH}{2}$$

A trapezium can also be divided into two triangles as indicated by the dotted line. The sum of the areas of these two triangles will give the area of the trapezium.



Regular Hexagon

R =radius of circumscribed circle

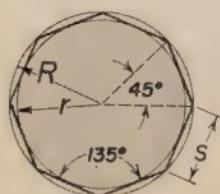
r =radius of inscribed circle

$$A = 2.598 s^2 = 2.598 R^2 = 3.464 r^2$$

$$R = s = 1.155 r$$

$$r = 0.866 s = 0.866 R$$

$$s = R = 1.155 r$$



Regular Octagon

R =radius of circumscribed circle

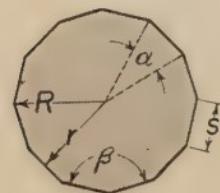
r =radius of inscribed circle

$$A = 4.828 s^2 = 2.828 R^2 = 3.314 r^2$$

$$R = 1.307 s = 1.082 r$$

$$r = 1.207 s = 0.924 R$$

$$s = 0.765 R = 0.828 r$$



Regular Polygon

n =number of sides

$$\alpha = 360^\circ \div n \quad \beta = 180^\circ - \alpha$$

$$A = \frac{n s r}{2} = \frac{n s}{2} \sqrt{R^2 - \frac{s^2}{4}}$$

$$R = \sqrt{r^2 + \frac{s^2}{4}}; r = \sqrt{R^2 - \frac{s^2}{4}}; s = 2 \sqrt{R^2 - r^2}$$

FLUIDS FOR CUTTING TOOLS

The use of cutting fluids is of advantage in most metal-cutting operations. Cutting fluids have many functions, several of which are listed below.

1. Lubrication to reduce friction and the resulting generation of heat between tools and work; between tools and chips; to prevent chips from fusing and sticking to ("choking up") tools.
2. Cooling to dissipate the generated heat and prevent overheating of both work and tools, thus ruining work and shortening tool life.
3. Chip disposal—Cutting fluids will help wash the chips away from the work and back through the flutes of drills, taps, etc.

Sulfurized oils combine good lubricating and cooling qualities and are recommended for machining steel, particularly if a good finish is desired.

Soluble oils have excellent cooling properties, but care should be exercised that water soluble compounds contain enough alkalinity to prevent rusting of the work.

Animal oils should be avoided, if possible, because of their bacterial properties and their tendency to become rancid.

Straight mineral oils can be used with fair success on medium heavy jobs, but they do not compare with sulfurized oils.

The chart below gives an idea of the uses of cutting fluids.

Material	Drilling	Reaming	Turning	Milling	Threading
Aluminum	Kerosene Kerosene & Lard Oil Soluble Oil	Kerosene Soluble Oil Mineral Oil	Soluble Oil	Soluble Oil Lard Oil Mineral Oil Dry	Soluble Oil Kerosene & Lard Oil
Brass	Dry Soluble Oil Kerosene & Lard Oil	Dry Soluble Oil	Soluble Oil	Dry Soluble Oil	Lard Oil Soluble Oil
Bronze	Soluble Oil Lard Oil Mineral Oil Dry	Soluble Oil Lard Oil Mineral Oil Dry	Soluble Oil	Soluble Oil Lard Oil Mineral Oil Dry	Lard Oil Soluble Oil
Cast Iron	Dry Air Jet Soluble Oil	Dry Soluble Oil Mineral Lard Oil	Dry Soluble Oil	Dry Soluble Oil	Sulphurized Oil Mineral Lard Oil
Cast Steel	Soluble Oil Mineral Lard Oil Sulphurized Oil	Soluble Oil Mineral Lard Oil Lard Oil	Soluble Oil	Soluble Oil Mineral Lard Oil	Mineral Lard Oil
Copper	Soluble Oil Dry Mineral Lard Oil Kerosene	Soluble Oil Lard Oil	Soluble Oil	Soluble Oil Dry	Soluble Oil Lard Oil
Malleable Iron	Dry Soda Water	Dry Soda Water	Soluble Oil	Dry Soda Water	Lard Oil & Soda
Monel Metal	Lard Oil Soluble Oil	Lard Oil Soluble Oil	Soluble Oil	Soluble Oil	Lard Oil
Steel, Mild	Soluble Oil Mineral Lard Oil Sulphurized Oil Lard Oil	Soluble Oil Mineral Lard Oil	Soluble Oil	Soluble Oil Mineral Lard Oil	Soluble Oil Mineral Lard Oil
Steel, Alloys, Forgings	Soluble Oil Sulphurized Oil Mineral Lard Oil	Soluble Oil Mineral Lard Oil Sulphurized Oil	Soluble Oil	Soluble Oil Mineral Lard Oil	Sulphurized Oil Lard Oil
Steel, Tool	Soluble Oil Mineral Lard Oil Sulphurized Oil	Soluble Oil Lard Oil Sulphurized Oil	Soluble Oil	Soluble Oil Lard Oil	Sulphurized Oil Lard Oil
Steel, Manganese (12 to 15%)	Dry				
Wrought Iron	Soluble Oil Mineral Lard Oil Sulphurized Oil	Soluble Oil Mineral Lard Oil	Soluble Oil	Soluble Oil Mineral Lard Oil	Soluble Oil Mineral Lard Oil

**APPROXIMATE NUMBER OF PIECES OBTAINABLE
FROM BARS, SHEETS, STRIP & PLATE**

Length or Width per Piece	Number of Pieces Per Width or Length from								
	24"	36"	48"	60"	72"	84"	96"	120"	144"
1.....	23	35	47	59	71	83	95	119	143
1 1/16.....	22	33	44	56	67	78	90	112	135
1 1/8.....	21	31	42	53	63	74	85	106	127
1 3/16.....	19	29	40	50	60	70	80	100	121
1 1/4.....	18	28	38	47	57	66	76	95	114
1 5/16.....	18	27	36	45	54	63	72	91	109
1 7/16.....	17	25	34	43	52	60	69	87	104
1 1/2.....	16	24	33	41	49	58	66	83	99
1 5/8.....	15	23	31	39	47	55	63	79	95
1 3/8.....	15	22	30	38	45	53	61	76	91
1 1/16.....	14	21	29	36	44	51	58	73	88
1 3/16.....	13	21	28	35	42	49	56	70	85
1 1/4.....	13	20	27	34	40	47	54	68	82
1 13/16.....	12	19	26	32	39	46	52	65	79
1 7/8.....	12	18	25	31	38	44	50	63	76
1 15/16.....	12	18	24	30	36	43	49	61	74
2.....	11	17	23	29	35	41	47	59	71
2 1/16.....	11	17	23	28	34	40	46	57	69
2 1/8.....	11	16	22	27	33	39	44	56	67
2 3/16.....	10	16	21	27	32	38	43	54	65
2 1/4.....	10	15	21	26	31	37	42	53	63
2 5/16.....	10	15	20	25	30	36	41	51	62
2 3/8.....	9	14	19	25	30	35	40	50	60
2 7/16.....	9	14	19	24	29	34	39	48	58
2 1/2.....	9	14	18	23	28	33	38	47	57
2 9/16.....	9	13	18	23	27	32	37	46	55
2 5/8.....	8	13	18	22	27	31	36	45	54
2 11/16.....	8	13	17	22	26	31	35	44	53
2 3/4.....	8	12	17	21	25	30	34	43	52
2 13/16.....	8	12	16	21	25	29	33	42	50
2 7/8.....	8	12	16	20	24	28	33	41	49
2 15/16.....	7	12	16	20	24	28	32	40	48
3.....	7	11	15	19	23	27	31	39	47
3 1/16.....	7	11	15	19	23	27	31	38	46
3 1/8.....	7	11	15	19	22	26	30	38	45
3 3/16.....	7	11	14	18	22	26	29	37	44
3 1/4.....	7	10	14	18	21	25	29	36	44
3 5/16.....	6	10	14	17	21	25	28	35	43
3 3/8.....	6	10	13	17	21	24	28	35	42
3 7/16.....	6	10	13	17	20	24	27	34	41
3 1/2.....	6	10	13	16	20	23	27	34	40
3 9/16.....	6	9	13	16	19	23	26	33	40
3 5/8.....	6	9	12	16	19	22	26	32	39
3 11/16.....	6	9	12	16	19	22	25	32	38
3 3/4.....	6	9	12	15	18	22	25	31	38
3 13/16.....	6	9	12	15	18	21	24	31	37
3 7/8.....	5	9	12	15	18	21	24	30	36
3 15/16.....	5	8	11	14	18	21	24	30	36
4.....	5	8	11	14	17	20	23	29	35
4 1/16.....	5	8	11	14	17	20	23	29	35
4 1/8.....	5	8	11	14	17	20	23	28	34
4 3/16.....	5	8	11	14	16	19	22	28	34
4 1/4.....	5	8	11	13	16	19	22	27	33
4 5/16.....	5	8	10	13	16	19	22	27	33
4 3/8.....	5	7	10	13	16	18	21	27	32
4 7/16.....	5	7	10	13	15	18	21	26	32
4 1/2.....	5	7	10	13	15	18	21	26	31
4 9/16.....	5	7	10	12	15	18	20	26	31
4 5/8.....	4	7	10	12	15	17	20	25	30
4 11/16.....	4	7	9	12	15	17	20	25	30
4 3/4.....	4	7	9	12	14	17	19	25	30
4 13/16.....	4	7	9	12	14	17	19	24	29
4 7/8.....	4	7	9	12	14	16	19	24	29
4 15/16.....	4	7	9	11	14	16	19	24	28
5.....	4	7	9	11	14	16	19	23	28
5 1/16.....	4	7	9	11	14	16	18	23	28
5 1/8.....	4	7	9	11	14	16	18	23	28
5 3/16.....	4	6	9	11	13	16	18	23	27
5 1/4.....	4	6	9	11	13	15	18	22	27
5 5/16.....	4	6	9	11	13	15	18	22	27
5 3/8.....	4	6	8	11	13	15	17	22	26
5 1/16.....	4	6	8	11	13	15	17	22	26
5 1/2.....	4	6	8	10	13	15	17	21	26
5 5/16.....	4	6	8	10	12	15	17	21	25
5 3/8.....	4	6	8	10	12	15	17	21	25

†These figures are for estimating purposes only and are based on sheared material. Cutting allowances for other types of cutting should be made.

†APPROXIMATE NUMBER OF PIECES OBTAINABLE FROM BARS, SHEETS, STRIP & PLATE (Cont.)

Length or Width per Piece	Number of Pieces per Width or Length from								
	24"	36"	48"	60"	72"	84"	96"	120"	144"
5 ¹ / ₁₆	4	6	8	10	12	14	16	21	25
5 ³ / ₄	4	6	8	10	12	14	16	20	25
5 ¹ / ₈	4	6	8	10	12	14	16	20	24
5 ⁷ / ₈	4	6	8	10	12	14	16	20	24
5 ¹ / ₁₆	4	6	8	10	12	14	16	20	24
6.....	3	5	7	9	11	13	15	19	23
6 ¹ / ₁₆	3	5	7	9	11	13	15	19	23
6 ¹ / ₈	3	5	7	9	11	13	15	19	23
6 ³ / ₁₆	3	5	7	9	11	13	15	19	23
6 ¹ / ₄	3	5	7	9	11	13	15	19	23
6 ⁵ / ₁₆	3	5	7	9	11	13	15	19	22
6 ³ / ₈	3	5	7	9	11	13	15	18	22
6 ⁷ / ₁₆	3	5	7	9	11	13	14	18	22
6 ¹ / ₂	3	5	7	9	11	12	14	18	22
6 ⁹ / ₁₆	3	5	7	9	10	12	14	18	21
6 ⁵ / ₈	3	5	7	9	10	12	14	18	21
6 ¹¹ / ₁₆	3	5	7	8	10	12	14	17	21
6 ³ / ₄	3	5	7	8	10	12	14	17	21
6 ¹³ / ₁₆	3	5	7	8	10	12	14	17	21
6 ⁷ / ₈	3	5	6	8	10	12	13	17	20
6 ¹⁵ / ₁₆	3	5	6	8	10	12	13	17	20
7.....	3	5	6	8	10	11	13	17	20
7 ¹ / ₁₆	3	5	6	8	10	11	13	16	20
7 ¹ / ₈	3	5	6	8	10	11	13	16	20
7 ³ / ₁₆	3	5	6	8	10	11	13	16	20
7 ¹ / ₄	3	4	6	8	9	11	13	16	19
7 ⁵ / ₁₆	3	4	6	8	9	11	13	16	19
7 ³ / ₈	3	4	6	8	9	11	13	16	19
7 ⁷ / ₁₆	3	4	6	8	9	11	12	16	19
7 ¹ / ₂	3	4	6	7	9	11	12	15	19
7 ⁹ / ₁₆	3	4	6	7	9	11	12	15	19
7 ⁵ / ₈	3	4	6	7	9	11	12	15	18
7 ¹³ / ₁₆	3	4	6	7	9	10	12	15	18
7 ⁷ / ₈	3	4	6	7	9	10	12	15	18
7 ¹⁵ / ₁₆	3	4	6	7	9	10	12	15	18
8.....	2	4	5	7	8	10	11	14	17
8 ¹ / ₁₆	2	4	5	7	8	10	11	14	17
8 ¹ / ₈	2	4	5	7	8	10	11	14	17
8 ³ / ₁₆	2	4	5	7	8	10	11	14	17
8 ¹ / ₄	2	4	5	7	8	10	11	14	17
8 ⁵ / ₁₆	2	4	5	7	8	10	11	14	17
8 ³ / ₈	2	4	5	7	8	10	11	14	17
8 ⁷ / ₁₆	2	4	5	7	8	9	11	14	17
8 ¹ / ₂	2	4	5	7	8	9	11	14	16
8 ⁹ / ₁₆	2	4	5	6	8	9	11	14	16
8 ⁵ / ₈	2	4	5	6	8	9	11	13	16
8 ¹¹ / ₁₆	2	4	5	6	8	9	11	13	16
8 ¹³ / ₁₆	2	4	5	6	8	9	10	13	16
8 ⁷ / ₈	2	4	5	6	8	9	10	13	16
8 ¹⁵ / ₁₆	2	4	5	6	8	9	10	13	16
9.....	2	3	5	6	7	9	10	13	15
9 ¹ / ₁₆	2	3	5	6	7	9	10	13	15
9 ¹ / ₈	2	3	5	6	7	9	10	13	15
9 ³ / ₁₆	2	3	5	6	7	9	10	13	15
9 ¹ / ₄	2	3	5	6	7	9	10	12	15
9 ⁵ / ₁₆	2	3	5	6	7	9	10	12	15
9 ³ / ₈	2	3	5	6	7	8	10	12	15
9 ⁷ / ₁₆	2	3	5	6	7	8	10	12	15
9 ¹ / ₂	2	3	5	6	7	8	10	12	15
9 ⁹ / ₁₆	2	3	5	6	7	8	10	12	15
9 ⁵ / ₈	2	3	4	6	7	8	9	12	14
9 ¹¹ / ₁₆	2	3	4	6	7	8	9	12	14
9 ³ / ₄	2	3	4	6	7	8	9	12	14
9 ¹³ / ₁₆	2	3	4	6	7	8	9	12	14
9 ⁷ / ₈	2	3	4	6	7	8	9	12	14
9 ¹⁵ / ₁₆	2	3	4	6	7	8	9	12	14
10.....	2	3	4	5	7	8	9	11	14
10 ¹ / ₈	2	3	4	5	7	8	9	11	14
10 ¹ / ₄	2	3	4	5	7	8	9	11	14
10 ³ / ₈	2	3	4	5	6	8	9	11	13
10 ¹ / ₂	2	3	4	5	6	7	9	11	13
10 ⁵ / ₈	2	3	4	5	6	7	9	11	13
10 ³ / ₄	2	3	4	5	6	7	8	11	13
10 ⁷ / ₈	2	3	4	5	6	7	8	11	13

†These figures are for estimating purposes only and are based on sheared material. Cutting allowances for other types of cutting should be made.

**†APPROXIMATE NUMBER OF PIECES OBTAINABLE
FROM BARS, SHEETS, STRIP & PLATE (Cont.)**

Length or Width per Piece	Number of Pieces per Width or Length from								
	24"	36"	48"	60"	72"	84"	96"	120"	144"
11.....	2	3	4	5	6	7	8	10	13
11 1/8.....	2	3	4	5	6	7	8	10	12
11 1/4.....	2	3	4	5	6	7	8	10	12
11 3/8.....	2	3	4	5	6	7	8	10	12
11 1/2.....	2	3	4	5	6	7	8	10	12
11 5/8.....	2	3	4	5	6	7	8	10	12
11 3/4.....	2	3	4	5	6	7	8	10	12
11 7/8.....	2	3	4	5	6	7	8	10	12
12.....	1	2	3	4	5	6	7	9	11
12 1/8.....	1	2	3	4	5	6	7	9	11
12 1/4.....	1	2	3	4	5	6	7	9	11
12 3/8.....	1	2	3	4	5	6	7	9	11
12 1/2.....	1	2	3	4	5	6	7	9	11
12 5/8.....	1	2	3	4	5	6	7	9	11
12 3/4.....	1	2	3	4	5	6	7	9	11
12 7/8.....	1	2	3	4	5	6	7	9	11
13.....	1	2	3	4	5	6	7	9	11
13 1/8.....	1	2	3	4	5	6	7	9	10
13 1/4.....	1	2	3	4	5	6	7	9	10
13 3/8.....	1	2	3	4	5	6	7	8	10
13 1/2.....	1	2	3	4	5	6	7	8	10
13 5/8.....	1	2	3	4	5	6	7	8	10
13 3/4.....	1	2	3	4	5	6	6	8	10
13 7/8.....	1	2	3	4	5	6	6	8	10
14.....	1	2	3	4	5	5	6	8	10
14 1/8.....	1	2	3	4	5	5	6	8	10
14 1/4.....	1	2	3	4	5	5	6	8	10
14 3/8.....	1	2	3	4	4	5	6	8	10
14 1/2.....	1	2	3	4	4	5	6	8	9
14 5/8.....	1	2	3	4	4	5	6	8	9
14 3/4.....	1	2	3	4	4	5	6	8	9
14 7/8.....	1	2	3	4	4	5	6	8	9
15.....	1	2	3	3	4	5	6	7	9
15 1/8.....	1	2	3	3	4	5	6	7	9
15 1/4.....	1	2	3	3	4	5	6	7	9
15 3/8.....	1	2	3	3	4	5	6	7	9
15 1/2.....	1	2	3	3	4	5	6	7	9
15 5/8.....	1	2	3	3	4	5	6	7	9
15 3/4.....	1	2	3	3	4	5	6	7	9
15 7/8.....	1	2	3	3	4	5	6	7	9
16.....	1	2	2	3	4	5	5	7	8
16 1/8.....	1	2	2	3	4	5	5	7	8
16 1/4.....	1	2	2	3	4	5	5	7	8
16 3/8.....	1	2	2	3	4	5	5	7	8
16 1/2.....	1	2	2	3	4	5	5	7	8
16 5/8.....	1	2	2	3	4	5	5	7	8
16 3/4.....	1	2	2	3	4	4	5	7	8
16 7/8.....	1	2	2	3	4	4	5	7	8
17.....	1	2	2	3	4	4	5	7	8
17 1/8.....	1	2	2	3	4	4	5	6	8
17 1/4.....	1	2	2	3	4	4	5	6	8
17 3/8.....	1	2	2	3	4	4	5	6	8
17 1/2.....	1	2	2	3	4	4	5	6	8
17 5/8.....	1	2	2	3	4	4	5	6	8
17 3/4.....	1	2	2	3	4	4	5	6	8
17 7/8.....	1	2	2	3	4	4	5	6	8
18.....	1	1	2	3	3	4	5	6	7
18 1/8.....	1	1	2	3	3	4	5	6	7
18 1/4.....	1	1	2	3	3	4	5	6	7
18 3/8.....	1	1	2	3	3	4	5	6	7
18 1/2.....	1	1	2	3	3	4	5	6	7
18 5/8.....	1	1	2	3	3	4	5	6	7
18 3/4.....	1	1	2	3	3	4	5	6	7
18 7/8.....	1	1	2	3	3	4	5	6	7
19.....	1	1	2	3	3	4	5	6	7
19 1/8.....	1	1	2	3	3	4	5	6	7
19 1/4.....	1	1	2	3	3	4	4	6	7
19 3/8.....	1	1	2	3	3	4	4	6	7
19 1/2.....	1	1	2	3	3	4	4	6	7
19 5/8.....	1	1	2	3	3	4	4	6	7
19 3/4.....	1	1	2	3	3	4	4	6	7
19 7/8.....	1	1	2	3	3	4	4	6	7

†These figures are for estimating purposes only and are based on sheared material. Cutting allowances for other types of cutting should be made.

STEEL CIRCLES

(THEORETICAL WEIGHTS BY POUNDS)

Dimensions — Diameter by Thickness in Inches

THICKNESS OF CIRCLES IN INCHES

Diam. In.	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
1	.028	.042	.056	.069	.083	.097	.111	.125	.139	.167	.195	.223
2	.111	.166	.222	.278	.333	.389	.444	.502	.557	.668	.779	.892
3	.249	.375	.500	.626	.749	.874	.999	1.13	1.25	1.50	1.75	2.01
4	.444	.666	.888	1.11	1.33	1.55	1.78	2.01	2.23	2.67	3.12	3.57
5	.693	1.04	1.388	1.74	2.08	2.43	2.78	3.14	3.48	4.18	4.87	5.58
6	.998	1.50	2.00	2.51	3.00	3.50	4.00	4.52	5.01	6.01	7.01	8.30
7	1.36	2.04	2.72	3.41	4.08	4.76	5.44	6.15	6.82	8.19	9.55	10.93
8	1.77	2.66	3.55	4.45	5.33	6.22	7.11	8.03	8.91	10.69	12.47	14.28
9	2.25	3.37	4.50	5.69	6.74	7.87	9.00	10.16	11.28	13.53	15.78	18.07
10	2.77	4.16	5.55	6.96	8.33	9.72	11.11	12.54	13.93	16.71	19.49	22.31
11	3.35	5.04	6.72	8.42	10.07	11.76	13.44	15.18	16.85	20.21	23.58	26.99
12	3.99	5.99	8.00	10.02	11.99	13.99	15.99	18.06	20.05	24.06	28.06	32.12
13	4.69	7.03	9.38	11.76	14.07	16.42	18.77	21.11	23.53	28.23	32.93	37.70
14	5.43	8.16	10.88	13.64	16.32	19.04	21.77	24.58	26.29	32.74	38.19	43.72
15	6.24	9.37	12.49	15.66	18.73	21.86	24.99	28.22	31.33	37.59	43.84	50.19
16	7	11	15	18	22	25	29	32	35	42	49	56
17	8	12	16	20	24	28	32	36	40	48	56	64
18	9	14	18	23	27	32	36	40	45	54	63	71
19	10	15	20	25	30	35	40	45	50	60	70	80
20	11	17	23	28	34	39	45	50	55	66	77	88
21	12	19	25	31	37	43	49	55	61	73	85	97
22	14	20	27	34	41	47	54	60	67	80	93	107
23	15	22	30	37	44	52	59	66	73	88	102	117
24	16	24	32	40	48	56	64	71	79	95	111	127
25	18	26	35	44	53	61	70	78	86	103	121	138
26	19	28	38	47	56	66	75	84	93	112	131	149
27	20	30	41	51	61	71	81	91	101	121	141	161
28	22	33	44	55	65	76	87	97	108	130	152	173
29	24	35	47	59	71	82	94	104	116	139	163	186
30	25	38	50	63	75	88	100	112	124	149	174	199
31	27	40	54	67	80	94	107	119	133	159	186	212
32	29	43	57	71	86	100	114	127	141	170	198	226
33	30	45	61	76	91	106	121	135	150	180	211	241
34	32	48	65	81	97	113	129	144	160	192	224	255
35	34	51	68	85	102	119	136	152	169	203	237	271
36	36	54	72	90	108	126	144	162	180	216	252	288
37	38	57	76	95	115	134	153	172	191	229	267	306
38	40	60	80	100	121	141	161	181	201	241	281	322
39	42	64	85	106	127	148	169	190	212	254	296	338
40	45	67	89	111	134	156	178	200	223	267	312	356
41	47	70	94	117	141	164	187	211	234	281	327	374
42	49	74	98	123	148	172	197	221	246	295	344	394
43	52	77	103	129	155	180	206	232	258	309	360	412
44	54	81	108	135	162	188	215	242	269	323	377	430
45	56	85	113	141	169	197	225	253	282	338	394	450
46	59	88	118	147	177	206	235	265	294	353	412	475
47	62	92	123	154	185	215	246	277	308	369	430	492
48	64	96	128	160	193	225	257	289	321	385	449	514
49	67	100	134	167	201	234	267	301	334	401	467	534
50	70	105	139	174	209	244	279	313	348	418	487	558
51	.....	109	145	181	217	253	289	325	362	434	506	578
52	.....	113	151	188	226	263	301	339	376	452	527	602
53	.....	117	156	195	235	273	313	352	391	469	547	626
54	.....	122	162	203	244	284	325	365	406	487	568	650
55	.....	126	168	210	253	295	337	379	421	505	589	674
56	.....	131	175	218	262	305	349	393	436	524	610	698
57	.....	136	181	226	272	317	362	407	453	543	633	724
58	.....	141	187	234	281	328	375	421	468	562	655	750
59	.....	145	194	242	291	339	387	436	484	581	678	774
60	.....	150	200	250	301	351	401	451	501	601	701	802
61	.....	155	207	259	311	362	414	466	518	621	724	828
62	.....	161	214	268	321	375	428	482	535	642	749	856
63	.....	166	221	276	332	387	442	497	553	663	774	884
64	.....	171	228	285	342	399	456	513	570	684	798	912
65	.....	177	235	294	353	412	471	529	588	706	823	942
66	.....	182	243	303	364	425	485	546	607	728	848	970
67	.....	188	250	313	375	438	500	563	625	750	874	1000
68	.....	193	257	322	386	450	515	579	643	772	900	1030
69	.....	199	265	331	398	464	530	596	663	795	927	1060
70	.....	205	273	341	409	477	545	613	682	818	954	1090
71	.....	211	281	351	421	491	561	631	702	842	982	1122
72	.....	217	289	361	433	505	577	649	722	866	1009	1154
73	.....	223	297	371	445	519	593	667	742	890	1038	1186
74	.....	226	305	381	458	534	610	686	763	915	1066	1220
75	.....	235	313	391	470	548	626	704	783	939	1095	1252

Continued on Page 267

STEEL CIRCLES

(THEORETICAL WEIGHTS BY POUNDS)

Dimensions — Diameter by Thickness in Inches

Diam. In.	THICKNESS OF CIRCLES IN INCHES									
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
76	322	402	482	563	643	723	804	964	1125	1286
77	330	413	495	578	660	743	825	990	1155	1320
78	339	423	508	593	678	762	847	1016	1186	1356
79	348	434	521	608	695	782	869	1043	1216	1390
80	356	445	534	623	713	802	891	1069	1247	1426
81	365	457	548	639	731	822	913	1096	1278	1462
82	374	468	561	655	749	842	936	1123	1310	1498
83	384	479	575	671	767	863	959	1151	1342	1534
84	393	491	589	687	786	884	982	1179	1375	1572
85	402	503	603	704	805	905	1006	1207	1408	1610
86	412	515	618	721	824	926	1029	1235	1441	1648
87	422	527	632	738	843	948	1054	1265	1475	1686
88	431	539	647	755	863	970	1078	1294	1509	1726
89	441	551	661	771	882	992	1102	1323	1543	1764
90	451	564	677	789	902	1015	1128	1353	1579	1804
91	461	576	692	807	922	1037	1153	1383	1614	1844
92	471	589	707	825	943	1060	1178	1414	1649	1886
93	482	602	722	843	963	1084	1204	1445	1686	1926
94	492	615	738	861	984	1107	1230	1476	1722	1968
95	503	628	754	879	1005	1131	1256	1507	1759	2010
96	513	641	769	897	1026	1154	1282	1538	1795	2052
97	524	654	785	916	1047	1178	1309	1570	1832	2094
98	535	668	801	935	1069	1202	1336	1603	1870	2138
99	546	682	818	954	1091	1227	1363	1636	1908	2182
100	557	696	835	974	1113	1252	1391	1669	1948	2226
101	568	710	852	994	1136	1278	1420	1704	1988	2272
102	579	724	869	1014	1158	1303	1448	1738	2027	2317
103	591	739	886	1034	1182	1329	1477	1772	2067	2363
104	602	753	903	1054	1204	1355	1505	1806	2107	2409
105	614	768	921	1074	1228	1381	1534	1841	2148	2455
106	626	782	939	1095	1251	1408	1564	1877	2189	2502
107	637	797	956	1116	1275	1434	1593	1912	2231	2550
108	649	812	974	1136	1299	1461	1623	1948	2273	2598
109	662	827	992	1158	1323	1488	1653	1984	2315	2646
110	673	842	1010	1179	1347	1516	1684	2021	2358	2695
111	686	857	1028	1200	1372	1543	1715	2058	2401	2744
112	693	873	1048	1222	1397	1571	1746	2095	2444	2793
113	711	889	1066	1244	1422	1599	1777	2133	2488	2844
114	724	904	1085	1266	1447	1628	1809	2171	2532	2894
115	736	920	1104	1288	1473	1657	1841	2209	2577	2945
116	749	936	1124	1311	1498	1686	1873	2247	2622	2997
117	762	953	1143	1334	1524	1715	1905	2286	2667	3048
118	775	969	1163	1357	1550	1744	1938	2326	2713	3101
119	788	985	1183	1380	1577	1774	1971	2365	2759	3154
120	802	1002	1203	1403	1604	1804	2005	2406	2807	3208
121	815	1019	1223	1426	1630	1834	2038	2445	2853	3260
122	829	1036	1243	1450	1657	1864	2072	2486	2900	3314
123	842	1053	1263	1474	1685	1895	2106	2527	2948	3369
124	856	1070	1284	1498	1712	1926	2140	2568	2996	3424
125	870	1087	1305	1522	1740	1957	2175	2610	3045	3480
126	884	1105	1326	1547	1768	1989	2210	2652	3093	3535
127	898	1122	1347	1571	1796	2020	2245	2694	3143	3592
128	912	1140	1368	1596	1824	2052	2280	2736	3192	3649
129	926	1158	1390	1621	1853	2085	2316	2779	3242	3706
130	941	1176	1411	1646	1882	2117	2352	2822	3293	3764
131	955	1194	1433	1672	1911	2150	2389	2866	3344	3822
132	970	1213	1455	1698	1940	2183	2425	2910	3395	3880
133	985	1231	1477	1723	1970	2216	2462	2954	3446	3939
134	1000	1250	1500	1750	1999	2249	2499	2999	3499	3999
135	1015	1268	1522	1775	2030	2284	2537	3044	3551	4059
136	1029	1286	1543	1801	2058	2315	2572	3087	3601	4116
137	1044	1305	1566	1827	2088	2349	2610	3132	3654	4177
138	1059	1324	1589	1854	2119	2384	2649	3178	3708	4238
139	1075	1344	1612	1881	2150	2418	2687	3225	3762	4300
140	1090	1363	1636	1908	2181	2453	2726	3271	3816	4362
141	1106	1383	1659	1936	2212	2489	2765	3318	3871	4424
142	1122	1402	1683	1963	2244	2524	2804	3365	3926	4487
143	1138	1422	1706	1991	2275	2560	2844	3413	3982	4551
144	1154	1442	1730	2019	2307	2596	2884	3461	4038	4614

BURSTING PRESSURE OF TUBES

Rules for Estimating Safe Limit of Bursting Pressure for Seamless Brass and Copper Tubing, and Pump Cylinder Linings, in Pounds Per Square Inch

FIRST—Ascertain the tensile strength of the metal in the tube, which varies according to the quality and temper; 40,000 pounds maximum per square inch for brass, and 30,000 pounds maximum per square inch for copper, are considered safe estimates, but not guaranteed.

SECOND—Multiply the tensile strength by the thickness of the metal in inches, or decimal parts of an inch.

THIRD—Divide by the radius (one-half of the diameter), expressed in inches, and the result will show the pressure in pounds per square inch.

A safety factor of six (6) being allowed, divide the above result by six (6). Example:—A tube 4 inches outside diameter, No. 8 B&S gage, made of brass, having 40,000 per square inch tensile strength, shows 428 pounds pressure per square inch.

$$\begin{array}{rcl} & 40,000 \text{ lb. per square inch.} \\ \text{EXAMPLE:} & .1284 \text{ or No. 8 B\&S thick.} \\ \frac{1}{2}\text{-diam. of 4-in. tube = 2 in.}} & \hline & 5136.0000 \\ \text{Factor of Safety, of 6)} & \hline & 2568.0000 \\ & \hline & 428 \text{ lb. pressure per sq. in.} \end{array}$$

To Find the Bursting Pressure of a Seamless Brass or Copper Tube

Double the gage in thousandths of an inch; multiply by 35.000 to 40.000 for brass, and 28.000 to 30.000 for copper; divide the product by the internal diameter; divide by the factor of safety chosen—usually from 4 to 8, average factor 6—Government use about 10 or 12.

To Find the Approximate Weight of One Foot of Brass or Copper Tubing

To determine the amount of material in cubic inches or parts thereof in the walls of any seamless tube, of which the inside and outside diameters are known; multiply the mean diameter in inches or decimal parts of an inch by 3.1416, and the result by the thickness in decimal parts of an inch, multiplied by the length in inches; the result being the number of cubic inches and this sum multiplied by .3069 for brass or .3227 for copper, will give the weight in pounds. The mean diameter is outside diameter, plus inside diameter divided by 2.

EXAMPLE:—Determine the weight of 1 foot of seamless brass tubing 9 inches inside diameter by No. 9 Stubs' gage—(No. 9 Stubs' gage = .148) $\times 2 = .296$ plus 9-inch inside = 9.296 outside diameter.

$9.296 + 9 = 18.296 \div 2 = 9.148 = \text{mean diameter}$; $9.148 \times 3.1416 = 28.7393$ $\times 12\text{-inch} = 344.8722 \times .148$ (decimal of gage) = 51.0390 cubic inches $\times .3069$ pounds per cubic inch for brass equals 15.664 pounds.

PIPE AND TUBING

Brass and Copper — Refer to Pages 7-9, 22-24

Aluminum — Refer to Pages 73-80

Carbon and Stainless Steel — Refer to Pages 95-118

BURSTING PRESSURES OF PIPE

Calculated by Barlow's Formula $P = \frac{2 St}{D}$

P=pressure in pounds per square inch; **t**=wall thickness in inches.
D=external diameter in inches; **S**=tensile stress in pounds per square inch;
 for welded pipe, ultimate stress=50,000 lbs. per sq. in.; for B-Grade Seamless=60,000 lbs. per sq. in.

Standard Pipe

Size Inches	External Diam. Inches	Wall Thickness Inches	Ultimate Bursting Pressure		Size Inches	External Diam. Inches	Wall Thickness Inches	Ultimate Bursting Pressure	
			Grade B	Seamless				Grade B	Seamless
1/8 ..	.405 ..	.068 ..	16775 ..	20148 ..	3 1/2 ..	4.000 ..	.226 ..	5650 ..	6780 ..
1/4 ..	.540 ..	.088 ..	16296 ..	19556 ..	4 ..	4.500 ..	.237 ..	5267 ..	6320 ..
3/8 ..	.675 ..	.091 ..	13481 ..	16178 ..	5 ..	5.563 ..	.258 ..	4638 ..	5565 ..
1/2 ..	.840 ..	.109 ..	12976 ..	15571 ..	6 ..	6.625 ..	.280 ..	4226 ..	5072 ..
5/8 ..	1.050 ..	.113 ..	10762 ..	12914 ..	8 ..	8.625 ..	.277 ..	3212 ..	3854 ..
1 ..	1.315 ..	.133 ..	10114 ..	12137 ..	8 ..	8.625 ..	.322 ..	3733 ..	4480 ..
1 1/4 ..	1.660 ..	.140 ..	8434 ..	10120 ..	10 ..	10.750 ..	.279 ..	2595 ..	3114 ..
1 1/2 ..	1.900 ..	.145 ..	7632 ..	9158 ..	10 ..	10.750 ..	.307 ..	2856 ..	3427 ..
2 ..	2.375 ..	.154 ..	6484 ..	7781 ..	10 ..	10.750 ..	.365 ..	3395 ..	4074 ..
2 1/2 ..	2.875 ..	.203 ..	7061 ..	8473 ..	12 ..	12.750 ..	.330 ..	2588 ..	3106 ..
3 ..	3.500 ..	.216 ..	6171 ..	7406 ..	12 ..	12.750 ..	.375 ..	2941 ..	3529 ..

Extra Strong Pipe

Size Inches	External Diam. Inches	Wall Thickness Inches	Ultimate Bursting Pressure		Size Inches	External Diam. Inches	Wall Thickness Inches	Ultimate Bursting Pressure	
			Grade B	Seamless				Grade B	Seamless
1/8 ..	.405 ..	.095 ..	23457 ..	28148 ..	2 1/2 ..	2.875 ..	.276 ..	9600 ..	11520 ..
1/4 ..	.540 ..	.119 ..	22037 ..	26444 ..	3 ..	3.500 ..	.300 ..	8571 ..	10286 ..
3/8 ..	.675 ..	.126 ..	18667 ..	22400 ..	3 1/2 ..	4.000 ..	.318 ..	7950 ..	9540 ..
1/2 ..	.840 ..	.147 ..	17500 ..	21000 ..	4 ..	4.500 ..	.337 ..	7489 ..	8987 ..
5/8 ..	1.050 ..	.154 ..	14667 ..	17600 ..	5 ..	5.563 ..	.375 ..	6741 ..	8089 ..
1 ..	1.315 ..	.179 ..	13612 ..	16335 ..	6 ..	6.625 ..	.432 ..	6521 ..	7825 ..
1 1/4 ..	1.660 ..	.191 ..	11506 ..	13807 ..	8 ..	8.625 ..	.500 ..	5797 ..	6957 ..
1 1/2 ..	1.900 ..	.200 ..	10526 ..	12632 ..	10 ..	10.750 ..	.500 ..	4651 ..	5581 ..
2 ..	2.375 ..	.218 ..	9179 ..	11015 ..	12 ..	12.750 ..	.500 ..	3922 ..	4706 ..

Double Extra Strong Pipe

1/2 ..	.840 ..	.294 ..	35000 ..	42000 ..	3 ..	3.500 ..	.600 ..	17143 ..	20571 ..
3/4 ..	1.050 ..	.308 ..	29333 ..	35200 ..	3 1/2 ..	4.000 ..	.636 ..	15900 ..	19080 ..
1 ..	1.315 ..	.358 ..	27224 ..	32669 ..	4 ..	4.500 ..	.674 ..	14978 ..	17973 ..
1 1/4 ..	1.660 ..	.382 ..	23012 ..	27614 ..	5 ..	5.563 ..	.750 ..	13482 ..	16178 ..
1 1/2 ..	1.900 ..	.400 ..	21053 ..	25263 ..	6 ..	6.625 ..	.864 ..	13042 ..	15650 ..
2 ..	2.375 ..	.436 ..	18358 ..	22029 ..	8 ..	8.625 ..	.875 ..	10145 ..	12174 ..
2 1/2 ..	2.875 ..	.552 ..	19200 ..	23040 ..					

The allowable working pressure in bursting, depending upon operating conditions, is determined by dividing the ultimate bursting pressure by one of the following factors of safety:

Operating Conditions	Factor of Safety
Steady, gradually increasing pressure	4
Sudden change (0 to Max.) in pressure	6
Vehement pulsations	8

U. S. GALLONS IN ROUND TANKS

For One Foot in Depth

Diam. of Tanks Ft. In.	No. U.S. Gals.	Cu. Ft. and Area in Sq. Ft.	Diam. of Tanks Ft. In.	No. U.S. Gals.	Cu. Ft. and Area in Sq. Ft.	Diam. of Tanks Ft. In.	No. U.S. Gals.	Cu. Ft. and Area in Sq. Ft.
1 ..	5.87	.785	5 9	194.25	25.97	19 ..	2120.90	283.53
1 1	6.89	.922	5 10	199.92	26.73	19 3	2177.10	291.04
1 2	8.00	1.069	5 11	205.67	27.49	19 6	2234.00	298.65
1 3	9.18	1.227	6 ..	211.51	28.27	19 9	2291.70	306.35
1 4	10.44	1.396	6 3	229.50	30.68	20 ..	2350.10	314.16
1 5	11.79	1.576	6 6	248.23	33.18	20 3	2409.20	322.06
1 6	13.22	1.767	6 9	267.69	35.78	20 6	2469.10	330.06
1 7	14.73	1.969	7 ..	287.88	38.48	20 9	2529.60	338.16
1 8	16.32	2.182	7 3	308.81	41.28	21 ..	2591.00	346.36
1 9	17.99	2.405	7 6	330.48	44.18	21 3	2653.00	354.66
1 10	19.75	2.640	7 9	352.88	47.17	21 6	2715.80	363.05
1 11	21.58	2.885	8 ..	376.01	50.27	21 9	2779.30	371.54
2 ..	23.50	3.142	8 3	399.88	53.46	22 ..	2843.60	380.13
2 1	25.50	3.409	8 6	424.48	56.75	22 3	2908.60	388.82
2 2	27.58	3.687	8 9	449.82	60.13	22 6	2974.30	397.61
2 3	29.74	3.976	9 ..	475.89	63.62	22 9	3040.80	406.49
2 4	31.99	4.276	9 3	502.70	67.20	23 ..	3108.00	415.48
2 5	34.31	4.587	9 6	530.24	70.88	23 3	3175.90	424.56
2 6	36.72	4.909	9 9	558.51	74.66	23 6	3244.60	433.74
2 7	39.21	5.241	10 ..	587.52	78.54	23 9	3314.00	443.01
2 8	41.78	5.585	10 3	617.26	82.52	24 ..	3384.10	452.39
2 9	44.43	5.940	10 6	647.74	86.59	24 3	3455.00	461.86
2 10	47.16	6.305	10 9	678.95	90.76	24 6	3526.60	471.44
2 11	49.98	6.681	11 ..	710.90	95.03	24 9	3598.90	481.11
3 ..	52.88	7.069	11 3	743.58	99.40	25 ..	3672.00	490.87
3 1	55.86	7.467	11 6	776.99	103.87	25 3	3745.80	500.74
3 2	58.92	7.876	11 9	811.14	108.43	25 6	3820.30	510.71
3 3	62.06	8.296	12 ..	846.03	113.10	25 9	3895.60	520.77
3 4	65.28	8.727	12 3	881.65	117.86	26 ..	3971.60	530.93
3 5	68.58	9.168	12 6	918.00	122.72	26 3	4048.40	541.19
3 6	71.97	9.621	12 9	955.09	127.68	26 6	4125.90	551.55
3 7	75.44	10.085	13 ..	992.91	132.73	26 9	4204.10	562.00
3 8	78.99	10.559	13 3	1031.50	137.89	27 ..	4283.00	572.66
3 9	82.62	11.045	13 6	1070.80	143.14	27 3	4362.70	583.21
3 10	86.33	11.541	13 9	1110.80	148.49	27 6	4443.10	593.96
3 11	90.13	12.048	14 ..	1151.50	153.94	27 9	4524.30	604.81
4 ..	94.00	12.566	14 3	1193.00	159.48	28 ..	4606.20	615.75
4 1	97.96	13.095	14 6	1235.30	165.13	28 3	4688.80	626.80
4 2	102.00	13.635	14 9	1278.20	170.87	28 6	4772.10	637.94
4 3	106.12	14.186	15 ..	1321.90	176.71	28 9	4856.20	649.18
4 4	110.32	14.748	15 3	1366.40	182.65	29 ..	4941.00	660.52
4 5	114.61	15.321	15 6	1411.50	188.69	29 3	5026.60	671.96
4 6	118.97	15.90	15 9	1457.40	194.83	29 6	5112.90	683.49
4 7	123.42	16.50	16 ..	1504.10	201.06	29 9	5199.90	695.13
4 8	127.95	17.10	16 3	1551.40	207.39	30 ..	5287.70	706.86
4 9	132.56	17.72	16 6	1599.50	213.82	30 3	5376.20	718.69
4 10	137.25	18.35	16 9	1648.40	220.35	30 6	5465.40	730.62
4 11	142.02	18.99	17 ..	1697.90	226.98	30 9	5555.40	742.64
5 ..	146.88	19.63	17 3	1748.20	233.71	31 ..	5646.10	754.77
5 1	151.82	20.29	17 6	1799.30	240.53	31 3	5737.50	766.99
5 2	156.83	20.97	17 9	1851.10	247.45	31 6	5829.70	779.31
5 3	161.93	21.65	18 ..	1903.60	254.47	31 9	5922.60	791.73
5 4	167.12	22.34	18 3	1956.80	261.59	32 ..	6016.20	804.25
5 5	172.38	23.04	18 6	2010.80	268.80	32 3	6110.60	816.86
5 6	177.72	23.76	18 9	2065.50	276.12	32 6	6205.70	829.58
5 8	188.66	25.22	19 ..	..	..	32 9	6301.50	842.39

31 1/2 Gallons Equal 1 Barrel

To find the capacity of tanks greater than the largest given in the table, look in the table for a tank of one-half the given size and multiply its capacity by 4, or one of one-third its size and multiply its capacity by 9, etc.

CIRCUMFERENCE AND AREA OF CIRCLES

OF ONE INCH				OF INCHES OR FEET					
Fract.	Dec.	Circum.	Area	Dia.	Circum.	Area	Dia.	Circum.	Area
$\frac{1}{64}$	.015625	.04909	.00019	1	3.1416	.7854	64	201.06	3216.99
$\frac{1}{32}$	.03125	.09818	.00077	2	6.2832	3.1416	65	204.20	3318.31
$\frac{3}{64}$	.046875	.14726	.00173	3	9.4248	7.0686	66	207.34	3421.19
$\frac{1}{16}$	.0625	.19635	.00307	4	12.5664	12.5664	67	210.49	3525.65
$\frac{5}{64}$	.078125	.24545	.00479	5	15.7080	19.635	68	213.63	3631.68
$\frac{3}{32}$	.09375	.29452	.00690	6	18.850	28.274	69	216.77	3739.28
$\frac{7}{64}$	.109375	.34363	.00939	7	21.991	38.485	70	219.91	3848.45
$\frac{1}{8}$	.125	.39270	.01227	8	25.133	50.266	71	223.05	3959.19
$\frac{9}{64}$	.140625	.44179	.01553	9	28.274	63.617	72	226.19	4071.50
$\frac{5}{32}$	.15625	.49087	.01917	10	31.416	78.540	73	229.34	4185.39
$\frac{11}{64}$	.171875	.53999	.02320	11	34.558	95.033	74	232.48	4300.84
$\frac{3}{16}$	.1875	.58905	.02761	12	37.699	113.1	75	235.62	4417.86
$\frac{13}{64}$	.203125	.63817	.03241	13	40.841	132.73	76	238.76	4536.46
$\frac{7}{32}$	.21875	.68722	.03758	14	43.982	153.94	77	241.90	4656.63
$\frac{15}{64}$	.234375	.73635	.04314	15	47.124	176.71	78	245.04	4778.36
$\frac{1}{4}$	.25	.78540	.04909	16	50.265	201.06	79	248.19	4901.67
$\frac{17}{64}$	.265625	.83449	.05542	17	53.407	226.98	80	251.33	5026.55
$\frac{9}{32}$	.28125	.88357	.06213	18	56.549	254.47	81	254.47	5153.00
$\frac{19}{64}$	.296875	.93266	.06922	19	59.690	283.53	82	257.61	5281.02
$\frac{5}{16}$	.3125	.98175	.07670	20	62.832	314.16	83	260.75	5410.61
$\frac{21}{64}$	.328125	1.0309	.08456	21	65.973	346.36	84	263.89	5541.77
$\frac{11}{32}$	.34375	1.0799	.09281	22	69.115	380.13	85	267.04	5674.50
$\frac{23}{64}$	.359375	1.1291	.10144	23	72.257	415.48	86	270.18	5808.80
$\frac{3}{8}$	.375	1.1781	.11045	24	75.398	452.39	87	273.32	5944.68
$\frac{25}{64}$	.390625	1.2273	.11984	25	78.540	490.87	88	276.46	6082.12
$\frac{13}{32}$	.40625	1.2763	.12962	26	81.681	530.93	89	279.60	6221.14
$\frac{27}{64}$	.421875	1.3254	.13979	27	84.823	572.56	90	282.74	6361.73
$\frac{7}{16}$	.4375	1.3744	.15033	28	87.965	615.75	91	285.88	6503.88
$\frac{29}{64}$	.453125	1.4236	.16126	29	91.106	660.52	92	289.03	6647.61
$\frac{15}{32}$	.46875	1.4726	.17257	30	94.248	706.86	93	292.17	6792.91
$\frac{31}{64}$	.484375	1.5218	.18427	31	97.389	754.77	94	295.31	6939.78
$\frac{1}{2}$	.5	1.5708	.19635	32	100.53	804.25	95	298.45	7088.22
$\frac{33}{64}$	.515625	1.6199	.20880	33	103.67	855.30	96	301.59	7238.23
$\frac{17}{32}$	.53125	1.6690	.22166	34	106.81	907.92	97	304.73	7339.81
$\frac{35}{64}$	.546875	1.7181	.23489	35	109.96	962.11	98	307.88	7542.96
$\frac{9}{16}$	.5625	1.7671	.24850	36	113.10	1017.88	99	311.02	7697.69
$\frac{37}{64}$	.578125	1.8163	.26248	37	116.24	1075.21	100	314.16	7854.00
$\frac{19}{32}$	.59375	1.8653	.27688	38	119.38	1134.11	101	317.30	8011.85
$\frac{39}{64}$	.609375	1.9145	.29164	39	122.52	1194.59	102	320.44	8171.28
$\frac{5}{8}$	.625	1.9635	.30680	40	125.66	1256.64	103	323.58	8332.29
$\frac{41}{64}$	.640625	2.0127	.32232	41	128.81	1320.25	104	326.73	8494.87
$\frac{21}{32}$	.65625	2.0617	.33824	42	131.95	1385.44	105	329.87	8659.01
$\frac{43}{64}$	.671875	2.1108	.35453	43	135.09	1452.20	106	333.01	8824.73
$\frac{11}{16}$	.6875	2.1598	.37122	44	138.23	1520.53	107	336.15	8992.02
$\frac{45}{64}$	.703125	2.2089	.38828	45	141.37	1590.43	108	339.29	9160.88
$\frac{23}{32}$	.71875	2.2580	.40574	46	144.51	1661.90	109	342.43	9331.32
$\frac{47}{64}$	.734375	2.3072	.42356	47	147.65	1734.94	110	345.58	9503.32
$\frac{3}{4}$	.75	2.3562	.44179	48	150.80	1809.56	111	348.72	9676.89
$\frac{49}{64}$	.765625	2.4054	.45253	49	153.94	1885.74	112	351.86	9852.03
$\frac{25}{32}$	.78125	2.4544	.47937	50	157.08	1963.50	113	355.00	10028.75
$\frac{51}{64}$	.796875	2.5036	.49872	51	160.22	2042.82	114	358.14	10207.03
$\frac{13}{16}$	.8125	2.5525	.51849	52	163.36	2123.72	115	361.28	10386.89
$\frac{53}{64}$	.828125	2.6017	.53862	53	166.50	2206.18	116	364.42	10568.32
$\frac{27}{32}$	.84375	2.6507	.55914	54	169.65	2290.22	117	367.57	10751.82
$\frac{55}{64}$	.859375	2.6999	.58003	55	172.79	2375.83	118	370.71	10935.88
$\frac{7}{8}$	.875	2.7489	.60132	56	175.93	2463.01	119	373.85	11122.02
$\frac{57}{64}$	.890625	2.7981	.62298	57	179.07	2551.76	120	376.99	11309.73
$\frac{29}{32}$	.90625	2.8471	.64504	58	182.21	2642.08	121	380.13	11499.01
$\frac{59}{64}$	.921875	2.8963	.66746	59	185.35	2733.97	122	383.27	11689.87
$\frac{15}{16}$	.9375	2.9452	.69029	60	188.50	2827.43	123	386.42	11882.29
$\frac{61}{64}$	.953125	2.9945	.71349	61	191.64	2922.47	124	389.56	12076.28
$\frac{31}{32}$	.96875	3.0434	.73708	62	194.78	3019.07	125	392.70	12271.85
$\frac{63}{64}$	.984375	3.0928	.76097	63	197.92	3117.25	126	395.84	12468.98

Rules Relative To The Circle

- Circumference of a circle equals the diameter multiplied by 3.1416
 Area of a circle equals the square of the diameter multiplied by 7854
 Radius of a circle equals the circumference multiplied by 0.15915
 Area of a circular ring equals the diameters of the two circles multiplied by the difference of the diameters and that product multiplied by .7854
 The diameter of a circle that shall contain a given square equals one side of the square multiplied by 1.1284
 One side of a square multiplied by 4.443 equals the circumference of its circumscribing circle.
 One side of a square multiplied by 1.128 equals the diameter of an equal circle.
 One side of a square multiplied by 3.547 equals the circumference of an equal circle.

GAGE STANDARDS

The following may be used as a guide, to avoid confusion, in determining what gage standard applies to a given product.

Aluminum

Sheets—Brown & Sharpe Gage (B&S).

Tubing—Stub's Gage.

Wire—Brown & Sharpe Gage (B&S).

Brass

Sheets and Strip (also Bronze and Nickel Silver)—Brown & Sharpe Gage (B&S).

Tubing—Stub's Gage.

Wire—Brown & Sharpe Gage (B&S).

Copper

Sheets—Specified in ounces per square foot or decimal thickness.

Wire—Brown & Sharpe Gage (B&S)

Tubing—Stub's Gage.

Steel

Sheets, Galvanized, Black, Cold Rolled, etc.—U. S. Std. Gage (U.S.S.)

Crucible Tool Steel—Stub's Gage.

Cold Rolled Strip and Cold Rolled Flat Wire—While Birmingham Wire Gage is sometimes used, decimal thickness measure is better.

Boiler Tubing—Minimum B.W.G. Wall.

All Other Tubing—Birmingham Wire Gage (B.W.G.)

Music Wire—should be ordered by decimal, since manufacturers are not in agreement as to diameters for certain gages.

Wire—Washburn and Moen Gage (W.&M.)

Drill and Coppered Bessemer Rods—Order by decimal equivalent of size desired.

Tin

Plates—Order by symbols IC, IX, IXX.

Zinc

Sheets—Standard Zinc Gage.

To assure accuracy, the size should be expressed in decimal parts of an inch or a small sample should be submitted.

U.S.S. (Old Standard) GAGE

(Used for Stainless Steel Sheets)

No. of Ga.	Thick- ness Dec. In.	Steel Approx. Wt. per Sq. Ft.	No. of Ga.	Thick- ness Dec. In.	Steel Approx. Wt. per Sq. In.
7	.1875	7.8	18	.0500	2.1
8	.1719	7.2	19	.04375	1.83
10	.1406	5.9	20	.0375	1.57
11	.1250	5.25	22	.0312	1.3
12	.1094	4.59	24	.0250	1.05
13	.09375	3.93	26	.01875	.787
14	.0781	3.28	28	.0156	.656
16	.0625	2.6	30	.0125	.525

STANDARD GAGES

With Equivalent in Decimal Parts of an Inch, and Weights

No. of Gage	Bir- ming- ham or Stubs'	Ameri- can or Brown and Sharpe	Wash- burn & Moen and Steel Wire Gage	Weight per 100 Ft. in Lbs. W. & M. Gage	U.S. Stand- ard Revised Gage	Weight per Sq. Ft. in Lbs. Steel, U.S. Stand. Gage	Music Wire
0000	.454	.460	.3938	40.94	.40625	16.575	.006
000	.425	.410	.3625	34.73	.3750	15.30	.007
00	.380	.365	.331	29.04	.34375	14.025	.008
0	.340	.325	.3065	27.66	.3125	12.75	.009
1	.300	.289	.283	21.23	.28125	11.475	.010
2	.284	.258	.2625	18.34	.26562	10.8375	.011
3	.259	.229	.2437	15.78	.2391	10.2	.012
4	.238	.204	.2253	13.39	.2242	9.5625	.013
5	.220	.182	.207	11.35	.2092	8.925	.014
6	.203	.162	.192	9.73	.1943	8.2875	.016
7	.180	.144	.177	8.03	.1793	7.65	.018
8	.165	.128	.162	6.96	.1644	7.0125	.020
9	.148	.114	.1483	5.87	.1495	6.375	.022
10	.134	.102	.135	4.83	.1345	5.7375	.024
11	.120	.091	.1205	3.82	.1196	5.1	.026
12	.109	.081	.1055	2.92	.1046	4.4625	.029
13	.095	.072	.0915	2.24	.0897	3.825	.031
14	.083	.064	.080	1.69	.0747	3.1875	.033
15	.072	.057	.072	1.37	.0673	2.86875	.035
16	.065	.051	.0625	1.05	.0598	2.55	.037
17	.058	.045	.054	.77	.0538	2.295	.039
18	.049	.040	.0475	.58	.0478	2.04	.041
19	.042	.036	.041	.45	.0418	1.785	.043
20	.035	.032	.0348	.32	.0359	1.53	.045
21	.032	.028	.0317	.27	.0329	1.4025	.047
22	.028	.025	.0286	.21	.0299	1.275	.049
23	.025	.023	.0258	.175	.0269	1.1475	.051
24	.022	.020	.023	.140	.0239	1.02	.055
25	.020	.018	.0204	.116	.0209	.8925	.059
26	.018	.016	.0181	.093	.0179	.765	.063
27	.016	.014	.0173	.083	.0164	.70125	.067
28	.014	.0126	.0162	.074	.0149	.6375	.071
29	.013	.011	.015	.061	.0135	.57375	.075
30	.012	.010	.014	.054	.0120	.51	.080
31	.010	.009	.0132	.050	.01094	.34625	.085
32	.009	.008	.0128	.046	.01016	.41438	.090
33	.008	.007	.0118	.037	.00938	.3825	.095
34	.007	.0063	.0104	.030	.00859	.35063	.100
35	.005	.0056	.0095	.025	.00781	.31875	.106
36	.004	.005	.009	.021	.00703	.28688	.112

The Galvanized Sheet Gage, established by custom, is based on the U. S. Standard Gage, each Galvanized Sheet Gage weight being 2.5 ounces per square foot heavier than the gage weight of the same U. S. Standard Gage Number regardless of coating weights.

Special Orders

We are able to furnish many items not regularly carried in our stocks. Call Ducommun for information on your requirements for special material.

STEEL WIRES**STEEL WIRE GAGE THE STANDARD**

W. & M. Wire Gage	Sizes of Wires		Pounds per Foot	Pounds per Mile	Feet per Pound
	Decimal Inches	Milli- meters			
7-0	.5000	12.70	.6668	3521.	1.500
	.4900	12.45	.6404	3381.	1.562
	.46875	11.91	.5861	3094.	1.706
6-0	.4615	11.72	.5681	2999.	1.76
5-0	.4375	11.11	.5105	2696.	1.959
	.4305	10.93	.4943	2610.	2.023
	.40625	10.32	.4402	2324.	2.272
4-0	.3938	10.00	.4136	2184.	2.418
3-0	.3750	9.525	.3751	1980.	2.666
	.3625	9.2075	.3505	1851.	2.853
	.34375	8.731	.3152	1664.	3.173
2-0	.3310	8.407	.2922	1543.	3.422
1-0	.3125	7.938	.2605	1375.	3.839
	.3065	7.785	.2506	1323.	3.991
	.2830	7.188	.2136	1128.	4.681
1	.28125	7.144	.2110	1114.	4.74
2	.2625	6.668	.1838	970.4	5.441
3	.2500	6.350	.1667	880.2	5.999
4	.2437	6.190	.1584	836.4	6.313
	.2253	5.723	.1354	714.8	7.386
5	.21875	5.556	.1276	673.9	7.835
	.2070	5.258	.1143	603.4	8.750
	.1920	4.877	.09832	519.2	10.17
6	.1875	4.763	.09377	495.1	10.66
7	.1770	4.496	.08356	441.2	11.97
8	.1620	4.115	.07000	369.6	14.29
9	.15625	3.969	.06512	343.8	15.36
	.1483	3.767	.05866	309.7	17.05
10	.1350	3.429	.04861	256.7	20.57
11	.125	3.175	.04168	220.0	24.00
12	.1205	3.061	.03873	204.5	25.82
	.1055	2.680	.02969	156.7	33.69
13	.09375	2.381	.02344	123.8	42.66
	.0915	2.324	.02233	117.9	44.78
	.0800	2.032	.01707	90.13	58.58
14	.0720	1.829	.01383	73.01	72.32
15	.0625	1.588	.01042	55.01	95.98
16	.0540	1.372	.007778	41.07	128.60
17	.0475	1.207	.006018	31.77	166.20
18	.0410	1.041	.0044	23.67	223.00
20	.0348	0.884	.0032	17.05	309.60

USE OUR TELEPHONE FACILITIES

Our inside salesmen are specially trained
to service your orders.

USEFUL INFORMATION

To find the circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

Area of rectangle. Length multiplied by breadth. Doubling the diameter of circle increases its area four times.

To find area of a triangle multiply base by one-half the perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find side of an inscribed square multiply diameter by 0.7071, or multiply circumference by 0.2251 or divide circumference by 4.4428.

To find side of an equal square multiply diameter by .8862.

Square. A side multiplied by 1.4142 equals diameter of its circumscribing circle.

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.128 equals diameter of an equal circle.

A side multiplied by 3.547 equals circumference of an equal circle.

Square inches multiplied by 1.273 equals circle inches of an equal circle.

To find cubic inches in a ball multiply cube of diameter by .5236.

To find cubic contents of a cone, multiply area of base by $\frac{1}{3}$ the altitude.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U.S. Standard) weighs $8\frac{1}{3}$ pounds and contains 231 cubic inches.

A cubic foot of water contains $7\frac{1}{2}$ gallons, 1728 cubic inches, and weighs $62\frac{1}{2}$ pounds.

To find the pressure in pounds per square inch of a column of water multiply the height of the column in feet by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard horse-power. The evaporation of 30 lbs. of water per hour from a feed water temperature of 100 degree F. into steam at 70 lbs. gauge pressure.

To find the capacity (U. S. gallons) of cylindrical tanks, square the diameter expressed in inches, multiply by the length and by .0034.

To ascertain heating surface in tubular boilers multiply $\frac{2}{3}$ the circumference of boiler by length of boiler in inches and add to it the area of all the tubes.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 per cent for drilled holes.

To find the capacity of an air compressor in cubic feet of free air per minute: Multiply the area of low pressure cylinder (on compound compressor), or area of simple compressor cylinder in square inches, by the stroke in inches and divide by 1728; and multiply this result —

(a) In single acting, simple or compound, by the R.P.M.

(b) Double acting, simple or compound, by $2 \times$ R.P.M.

(c) Duplex double acting, by $4 \times$ R.P.M.

METALLURGICAL AND ENGINEERING DATA

Ask for the separately-bound Section of our
General Catalog.

Alloys • Formulae • Analyses

Mechanical Properties • Comparison Tables

Specifications • Dimensions • Weights • Tolerances

Fabrication Recommendations and Other Important Data

EQUIVALENT MEASURES**Measures of Length****1 Meter =**

39.37	inches.
3.28083	feet.
1.09361	yards.
1000.	millimeters.
100.	centimeters.
10.	decimeters.
0.001	kilometers.

1 Inch =

1000.	mils.
0.0833	foot.
0.02777	yard.
25.40	millimeters.
2.540	centimeters.

1 Centimeter =

0.3937	inch.
0.0328083	foot.
10.	millimeters.
0.01	meters.

1 Foot =

12.	inches.
0.33333	yard.
0.0001893	miles.
0.30180	meter.

1 Millimeter =

39.370	mils.
0.03937	inch (or 1/25 inch approx.).
0.001	meter.

1 Yard =

36.	inches.
3.	feet.
0.0005681	mile.
0.914402	meter.

Kilometer =

3280.83	feet.
1093.61	yards.
0.62137	mile.
1000.	meters.

1 Mile =

63360.	inches.
5280.	feet.
1760.	yards.
320.	rods.
8.	furlongs.
1609.35	meters.
1.60935	kilometers.

Mil =

0.001	inch.
0.02540	millimeter.
0.00254	centimeter.

Measures of Volume and Capacity**1 Cubic Liter =**

61023.4	cubic ins.
35.3145	cubic feet.
1.30794	cubic yds.
1000.	liters.
264.170	gallons U.S. liquid = 231 cubic ins.

1 Liter =

1.	cubic deci- meter.
61.0234	cubic inches.
0.353164	cubic foot.
1000.	cubic centi- meters or centiliters.
0.001	cubic meter.
0.26417	U.S. gallon liquid.

1 Cubic Decimeter =

61.0234	cubic ins.
0.0353145	cubic foot.
0.26417	U.S. liquid gallon.
1000.	cubic centi- meters.
0.001	cubic meter.

1 Cubic Yard =

46656.	cubic inches.
27.	cubic feet.
0.76456	cubic meter.

1 Cubic Centimeter =

0.0000353	cubic foot.
0.0610234	cubic inch.
1000.0	cubic milli- meters.
0.001	liter.

1 Cubic Foot =

1728.	cubic inches.
0.03703703	cubic yard.
28.317	cubic deci- meters or liters
0.028317	cubic meter.
7.4805	gallons.

1 Cubic Millimeter =

0.0000061023	cubic inch.
0.0000000353	cubic foot.
0.001	cubic centi- meter.

1 Cubic Inch =

16.3872	cubic centimeters.
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1 Gallon (British) =

4.54374	liters.
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1 Gallon (U.S.) =

3.7854	liters.
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EQUIVALENT MEASURES (Cont.)**Measures of Weight**

1 Gram =	1 Gram =
15.432 grains.	0.064799 grains.
0.002205 lb. (avoir.)	
0.035274 oz. (avoir.)	
1 Kilogram =	1 Ounce =
1000. grams.	437.5 grains.
2.20462 lb. (avoir.)	0.0625 pounds.
35.2739 oz. (avoir.)	28.3495 grams.
1 Metric Ton =	1 Pound =
2204.62 pounds.	7000. grains.
0.984206 ton of 2240	16. ounces.
pounds.	453.5924 grams.
22.0462 cwt.	0.453592 kilograms.
1.10231 ton of 2000	
pounds.	
1000. kilograms.	
	1 Ton (2240 pounds) =
	1.01605 metric tons.
	1016.05 kilograms.

Measures of Surface

1 Circular Millimeter =	1 Square millimeter =
1217.37 square mils.	1973.52 circular mils.
.00155 circular inch.	1550.00 square mils.
1. circular milli- meter.	0.001550 square inch.
	0.01 square centi- meter.
1 Circular millimeter =	1 Square inch =
1550.0 circular mils.	1000000. square mils.
	1273240. circular mils.
	6.45163 square centi- meters.
	645.163 square milli- meters.
	0.006944 square foot.
1 Square meter =	1 Square foot =
1550.0 square inches.	144. square inches.
10.7639 square feet.	0.111111 square yard.
1.19598 square yards.	0.0929034 square meter.
10000. square centi- meters.	
1 Square centimeter =	1 Square yard =
197352. circular mils.	9. square feet.
0.15500 square inch.	1296. square inches.
0.0001 square meter.	0.836131 square meter.

New Materials

If you do not find the metals you are looking for listed in this book, Phone Us.

New materials and sizes are constantly being added to our stocks.

We may have the exact metal you require.

GAGE NUMBERS AND MILLIMETER EQUIVALENTS

Gage No.	American or Brown & Sharpe's		Birmingham or Stubs'	
	Inches	Millimeters	Inches	Millimeters
000000	.5800	14.732	.....	.....
00000	.5165	13.119	.500	12.700
0000	.4600	11.684	.454	11.532
000	.4096	10.404	.425	10.795
00	.3648	9.266	.380	9.652
0	.3249	8.252	.340	8.636
1	.2893	7.348	.300	7.620
2	.2576	6.543	.284	7.214
3	.2294	5.827	.259	6.579
4	.2043	5.189	.238	6.045
5	.1819	4.620	.220	5.588
6	.1620	4.115	.203	5.156
7	.1443	3.665	.180	4.572
8	.1285	3.264	.165	4.191
9	.1144	2.906	.148	3.759
10	.1019	2.588	.134	3.404
11	.09074	2.305	.120	3.048
12	.08081	2.053	.109	2.769
13	.07196	1.828	.095	2.413
14	.06408	1.628	.083	2.108
15	.05707	1.450	.072	1.829
16	.05082	1.291	.065	1.651
17	.04526	1.150	.058	1.473
18	.04030	1.024	.049	1.245
19	.03589	.912	.042	1.067
20	.03196	.812	.035	.889
21	.02846	.723	.032	.813
22	.02535	.644	.028	.711
23	.02257	.573	.025	.635
24	.02010	.511	.022	.559
25	.01790	.455	.020	.508
26	.01594	.405	.018	.457
27	.01420	.361	.016	.406
28	.01264	.321	.014	.356
29	.01126	.286	.013	.330
30	.01003	.255	.012	.305
31	.008928	.227	.010	.254
32	.007950	.202	.009	.229
33	.007080	.180	.008	.20
34	.006304	.160	.007	.178
35	.005614	.143	.005	.127
36	.005000	.127	.004	.102
37	.004453	.113	.....	.....
38	.003965	.101	.....	.....
39	.003531	.090	.....	.....
40	.003144	.080	.....	.....
41	.002800	.071	.....	.....
42	.002494	.063	.....	.....
43	.002221	.056	.....	.....
44	.001978	.050	.....	.....

INVENTORIES

Take advantage of our complete stocks of metals ware-housed within easy reach of your plant.

This means a smaller investment in your own inventory.

DECIMALS OF A FOOT FOR EACH 64TH OF AN INCH

O Inch	1 Inch	2 Inches	3 Inches	4 Inches	5 Inches	6 Inches	7 Inches	8 Inches	9 Inches	10 Inches	11 Inches
.0000	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167
1/64 .0013	.0846	.1680	.2513	.3346	.4180	.5013	.5846	.6680	.7513	.8346	.9180
5/32 .0026	.0859	.1693	.2526	.3359	.4193	.5026	.5859	.6693	.7526	.8359	.9193
3/64 .0039	.0872	.1706	.2539	.3372	.4206	.5039	.5872	.6706	.7539	.8372	.9206
1/16 .0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219
5/64 .0065	.0898	.1732	.2565	.3398	.4232	.5065	.5898	.6732	.7565	.8398	.9232
3/32 .0078	.0911	.1745	.2578	.3411	.4245	.5078	.5911	.6745	.7578	.8411	.9245
7/64 .0091	.0924	.1758	.2591	.3424	.4258	.5091	.5924	.6758	.7591	.8424	.9258
1/8 .0104	.0937	.1771	.2604	.3437	.4271	.5104	.5937	.6771	.7604	.8437	.9271
9/64 .0117	.0951	.1784	.2617	.3451	.4284	.5117	.5951	.6784	.7617	.8451	.9284
5/32 .0130	.0964	.1797	.2630	.3464	.4297	.5130	.5964	.6797	.7630	.8464	.9297
11/64 .0143	.0977	.1810	.2643	.3477	.4310	.5143	.5977	.6810	.7643	.8477	.9310
3/16 .0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323
13/64 .0169	.1003	.1836	.2669	.3503	.4336	.5169	.6003	.6836	.7669	.8503	.9336
7/32 .0182	.1016	.1849	.2682	.3516	.4349	.5182	.6016	.6849	.7682	.8516	.9349
15/64 .0195	.1029	.1862	.2695	.3529	.4362	.5195	.6029	.6862	.7695	.8529	.9362
1/4 .0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375
17/64 .0221	.1055	.1888	.2721	.3555	.4388	.5221	.6055	.6888	.7721	.8555	.9388
9/32 .0234	.1068	.1901	.2734	.3568	.4401	.5234	.6068	.6901	.7734	.8568	.9401
19/64 .0247	.1081	.1914	.2747	.3581	.4414	.5247	.6081	.6914	.7747	.8581	.9414
5/16 .0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427
21/64 .0273	.1107	.1940	.2773	.3607	.4440	.5273	.6107	.6940	.7773	.8607	.9440
11/32 .0286	.1120	.1953	.2786	.3620	.4453	.5286	.6120	.6953	.7786	.8620	.9453
23/64 .0299	.1133	.1966	.2799	.3633	.4466	.5299	.6133	.6966	.7799	.8633	.9466
3/8 .0312	.1146	.1979	.2812	.3646	.4479	.5313	.6146	.6979	.7812	.8646	.9479
25/64 .0326	.1159	.1992	.2826	.3659	.4492	.5326	.6159	.6992	.7826	.8659	.9492
13/32 .0339	.1172	.2005	.2839	.3672	.4505	.5339	.6172	.7005	.7839	.8672	.9505
27/64 .0352	.1185	.2018	.2852	.3685	.4518	.5352	.6185	.7018	.7852	.8685	.9518
7/16 .0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531
29/64 .0378	.1211	.2044	.2878	.3711	.4544	.5378	.6211	.7044	.7878	.8711	.9544
15/32 .0391	.1224	.2057	.2891	.3724	.4557	.5391	.6224	.7057	.7891	.8724	.9557
31/64 .0404	.1237	.2070	.2904	.3737	.4570	.5404	.6237	.7070	.7904	.8737	.9570
1/2 .0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583
33/64 .0430	.1263	.2096	.2930	.3763	.4596	.5430	.6263	.7096	.7930	.8763	.9596
17/32 .0443	.1276	.2109	.2943	.3776	.4609	.5443	.6276	.7109	.7943	.8776	.9609
35/64 .0456	.1289	.2122	.2956	.3789	.4622	.5456	.6289	.7122	.7956	.8789	.9622
7/8 .0469	.1302	.2135	.2969	.3802	.4635	.5469	.6302	.7135	.7969	.8802	.9635
37/64 .0482	.1315	.2148	.2982	.3815	.4648	.5482	.6315	.7148	.7982	.8815	.9648
19/32 .0495	.1328	.2161	.2995	.3828	.4661	.5495	.6328	.7161	.7995	.8828	.9661
39/64 .0508	.1341	.2174	.3008	.3841	.4674	.5508	.6341	.7174	.8008	.8841	.9674
5/8 .0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688
41/64 .0534	.1367	.2201	.3034	.3867	.4701	.5534	.6367	.7201	.8034	.8867	.9701
21/32 .0547	.1380	.2214	.3047	.3880	.4714	.5547	.6380	.7214	.8047	.8880	.9714
43/64 .0560	.1393	.2227	.3060	.3893	.4727	.5560	.6393	.7227	.8060	.8893	.9727
11/16 .0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740
45/64 .0586	.1419	.2253	.3086	.3919	.4753	.5586	.6419	.7253	.8086	.8919	.9753
23/32 .0599	.1432	.2266	.3099	.3932	.4766	.5599	.6432	.7266	.8099	.8932	.9766
47/64 .0612	.1445	.2279	.3112	.3945	.4779	.5612	.6445	.7279	.8112	.8945	.9779
3/4 .0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792
49/64 .0638	.1471	.2305	.3138	.3971	.4805	.5638	.6471	.7305	.8138	.8971	.9805
25/32 .0651	.1484	.2318	.3151	.3984	.4818	.5651	.6484	.7318	.8151	.8984	.9818
51/64 .0664	.1497	.2331	.3164	.3997	.4831	.5664	.6497	.7331	.8164	.8997	.9831
13/16 .0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844
53/64 .0690	.1523	.2357	.3190	.4023	.4857	.5690	.6523	.7357	.8190	.9023	.9857
27/32 .0703	.1536	.2370	.3203	.4036	.4870	.5703	.6536	.7370	.8203	.9036	.9870
55/64 .0716	.1549	.2383	.3216	.4049	.4883	.5716	.6549	.7383	.8216	.9049	.9883
7/8 .0729	.1562	.2396	.3229	.4062	.4896	.5729	.6562	.7396	.8229	.9062	.9896
57/64 .0742	.1576	.2409	.3242	.4076	.4909	.5742	.6576	.7409	.8242	.9076	.9909
29/32 .0755	.1589	.2422	.3255	.4089	.4922	.5755	.6589	.7422	.8255	.9089	.9922
59/64 .0768	.1602	.2435	.3268	.4102	.4935	.5768	.6602	.7435	.8268	.9102	.9935
15/16 .0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948
61/64 .0794	.1628	.2461	.3294	.4128	.4961	.5794	.6628	.7461	.8294	.9128	.9961
31/32 .0807	.1641	.2474	.3307	.4141	.4974	.5807	.6641	.7474	.8307	.9141	.9974
63/64 .0820	.1654	.2487	.3320	.4154	.4987	.5820	.6654	.7487	.8320	.9154	.9980

METRIC EQUIVALENTS (Decimal)

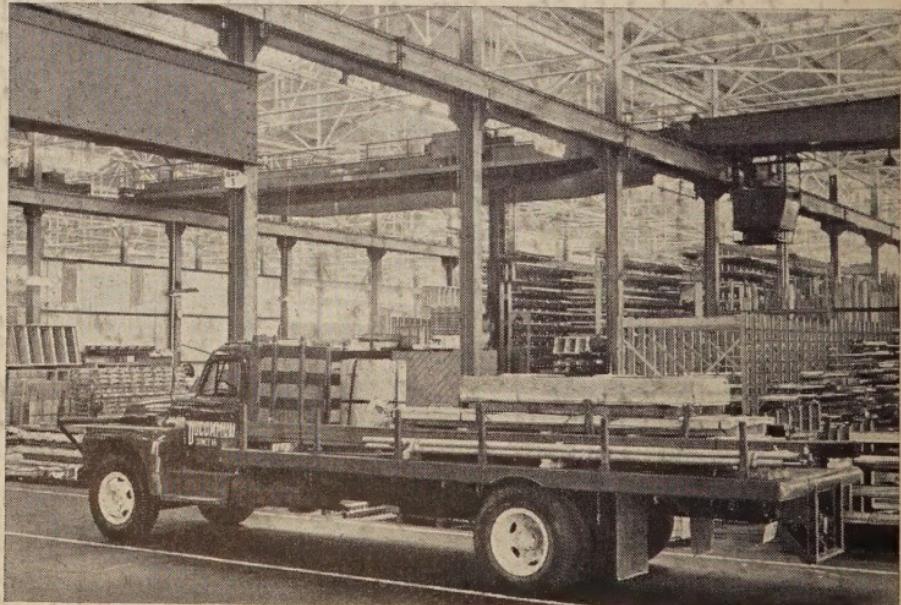
100ths Mm.	Dec. Inch	100ths Mm.	Dec. Inch	100ths Mm.	Dec. Inch	100ths Mm.	Dec. Inch
1 = .00039	.01024	26 = .01024	.02008	51 = .02008	.02992	76 = .02992	
2 = .00079	.01063	27 = .01063	.02047	52 = .02047	.03032	77 = .03032	
3 = .00118	.01102	28 = .01102	.02087	53 = .02087	.03071	78 = .03071	
4 = .00157	.01142	29 = .01142	.02126	54 = .02126	.03110	79 = .03110	
5 = .00197	.01181	30 = .01181	.02165	55 = .02165	.03150	80 = .03150	
6 = .00236	.01220	31 = .01220	.02205	56 = .02205	.03189	81 = .03189	
7 = .00276	.01260	32 = .01260	.02244	57 = .02244	.03228	82 = .03228	
8 = .00315	.01299	33 = .01299	.02283	58 = .02283	.03268	83 = .03268	
9 = .00354	.01339	34 = .01339	.02323	59 = .02323	.03307	84 = .03307	
10 = .00394	.01378	35 = .01378	.02362	60 = .02362	.03346	85 = .03346	
11 = .00433	.01417	36 = .01417	.02402	61 = .02402	.03386	86 = .03386	
12 = .00472	.01457	37 = .01457	.02441	62 = .02441	.03425	87 = .03425	
13 = .00512	.01496	38 = .01496	.02480	63 = .02480	.03465	88 = .03465	
14 = .00551	.01535	39 = .01535	.02520	64 = .02520	.03504	89 = .03504	
15 = .00591	.01575	40 = .01575	.02559	65 = .02559	.03543	90 = .03543	
16 = .00630	.01614	41 = .01614	.02598	66 = .02598	.03583	91 = .03583	
17 = .00669	.01654	42 = .01654	.02638	67 = .02638	.03622	92 = .03622	
18 = .00709	.01693	43 = .01693	.02677	68 = .02677	.03661	93 = .03661	
19 = .00748	.01732	44 = .01732	.02717	69 = .02717	.03701	94 = .03701	
20 = .00787	.01772	45 = .01772	.02756	70 = .02756	.03740	95 = .03740	
21 = .00827	.01811	46 = .01811	.02795	71 = .02795	.03780	96 = .03780	
22 = .00866	.01850	47 = .01850	.02835	72 = .02835	.03819	97 = .03819	
23 = .00906	.01890	48 = .01890	.02874	73 = .02874	.03858	98 = .03858	
24 = .00945	.01929	49 = .01929	.02913	74 = .02913	.03898	99 = .03898	
25 = .00984	.01969	50 = .01969	.02953	75 = .02953		1Mm. = .03937	

10 mm. = 1 centimeter =
0.3937 inches.

10 cm. = 1 decimeter =
3.937 inches.

10 dm. = 1 meter = 39.37
inches.

25.4 mm. = 1 English
inch.

**DELIVERY SERVICE**

Your orders are delivered, or in the process of being delivered,
within twenty-four hours.

**DECIMAL EQUIVALENTS
OF FRACTIONAL PARTS OF AN INCH**

FRACTION INCH	DECIMAL INCH	DECIMAL MILLI-METER	FRACTION INCH	DECIMAL INCH	DECIMAL MILLI-METER
$\frac{1}{64}$	.015625	0.39688	$\frac{33}{64}$	.515625	13.09690
$\frac{1}{32}$	.03125	0.79375	$\frac{17}{32}$	.53125	13.49378
$\frac{3}{64}$	.046875	1.19063	$\frac{35}{64}$	.546875	13.89065
$\frac{1}{16}$	.0625	1.58750	$\frac{9}{16}$	.5625	14.28753
$\frac{5}{64}$	.078125	1.98438	$\frac{37}{64}$	.578125	14.68440
$\frac{3}{32}$	.09375	2.38125	$\frac{19}{32}$	.59375	15.08128
$\frac{7}{64}$	.109375	2.77813	$\frac{39}{64}$	.609375	15.47816
$\frac{1}{8}$	.1250	3.17501	$\frac{5}{8}$	.6250	15.87503
$\frac{9}{64}$	.140625	3.57188	$\frac{41}{64}$	.640625	16.27191
$\frac{5}{32}$	.15625	3.96875	$\frac{21}{32}$	.65625	16.66878
$\frac{11}{64}$	.171875	4.36563	$\frac{43}{64}$	.671875	17.06566
$\frac{3}{16}$	.1875	4.76251	$\frac{11}{16}$	.6875	17.46253
$\frac{13}{64}$	.203125	5.15939	$\frac{45}{64}$	.703125	17.85941
$\frac{7}{32}$	.21875	5.55626	$\frac{23}{32}$	.71875	18.25629
$\frac{15}{64}$	.234375	5.95314	$\frac{47}{64}$	.734375	18.65316
$\frac{1}{4}$	.2500	6.35001	$\frac{3}{4}$	.7500	19.05004
$\frac{17}{64}$	.265625	6.74689	$\frac{49}{64}$	.765625	19.44681
$\frac{9}{32}$	.28125	7.14376	$\frac{25}{32}$	.78125	19.84379
$\frac{19}{64}$	.296875	7.54064	$\frac{51}{64}$	.796875	20.24067
$\frac{5}{16}$	.3125	7.93752	$\frac{13}{16}$	.8125	20.63754
$\frac{21}{64}$	.328125	8.33439	$\frac{53}{64}$	.828125	21.03442
$\frac{11}{32}$	.34375	8.73127	$\frac{27}{32}$	.84375	21.43129
$\frac{23}{64}$	.359375	9.12814	$\frac{55}{64}$	.859375	21.82817
$\frac{3}{8}$	.3750	9.52502	$\frac{7}{8}$	.8750	22.22504
$\frac{25}{64}$	.390625	9.92189	$\frac{57}{64}$	.890625	22.62182
$\frac{13}{32}$	.40625	10.31877	$\frac{29}{32}$	.90625	23.01830
$\frac{27}{64}$	.421875	10.71565	$\frac{59}{64}$	.921875	23.41567
$\frac{7}{16}$	.4375	11.11252	$\frac{15}{16}$	.9375	23.81255
$\frac{29}{64}$	.453125	11.50940	$\frac{61}{64}$	.953125	24.20942
$\frac{15}{32}$	.46875	11.90627	$\frac{31}{32}$	.96875	24.60630
$\frac{31}{64}$	.484375	12.30315	$\frac{63}{64}$	.984375	25.00318
$\frac{1}{2}$	.5000	12.70003	1	1.0000	25.40005

DUCOMMUN

METALS COLOR IDENTIFICATION

CARBON AND ALLOY STEEL BARS

C1010-1/16"	Plain	C1137	Pink
-3/32"	Red	C1144	Brown
-1/8"	White	E-4130-CDHT	Red
C1018	White	-CDN	Gray
C1018 Rectangular:		-HRM	Black
3/16" & 1/2"	Pink	E-4140-HRN	Pink
1/4" & 5/8"	Green	-ACD	Blue
5/16" & 7/8"	Black	E-4330-MOD	Gold
3/8" & 1"	Yellow	E-4340-CDA	Yellow
3/4", 1-3/4" & 3"	White	-HRA	Brown
C1045	Red	E-4520-CD & HR	Aluminum
B1113	Black	E-8740	Orange
Leaded C.F. Grade A	Green	E-9310-CDA	White
Grade B	Orange	-HRA	Purple
C1117	Blue		

HOT ROLLED CARBON STEEL PLATES

Firebox	Red	High Strength	White
Ledloy F. M.	Yellow	C1116 F. M.	Green
Abr. Resistant	Orange	Regular Sheared	(None)

STAINLESS STEEL BARS AND BILLETS

17-4PH	Blue & Gold	347	Red & Yellow
PH15-7MO	Gold	347-F Se	Black & White
17-7PH	Red & White	410	Green & White
A286	Orange	416	Brown
302 (Cond. B)	Yellow	416 (Cond. H)	Brown & White
303 Se (Cond. A)	Pink	430	Red & White
303 Se (Cond. B)	Blue	430F	Red & Blue
303 Sulphur	Pink & Yellow	431	Black
304	Red	440C	Red & Black
316	Green	440F	Red & Green
321	Yellow & Brown		

STAINLESS STEEL PLATES

304	Red	321	Green
304ELC	Yellow	347	Black
310	Pink	410	Orange
316	Blue		

ALUMINUM BARS

1100	White	2024	Red
2011	Brown	6061	Blue
2014	Orange	6262	Pink
2017	Yellow	7075	Black

ALUMINUM PIPE

3003	Pink	6063	Green
6061	Blue		

COPPER AND COPPER ALLOYS

RODS

Tobin Bronze	Green
Naval Bronze	Red
Everdur 1010	Black
1012	White
1014	Orange
Leaded Copper	Yellow
Free Cutting Brass	-
Copper	-

FLAT SHEETS

C. R. Copper	Black
H. R. Copper	Red
Red Brass	Red
Spring Brass	Green
Half Hard Brass	Pink
Soft Brass	Orange
Naval Brass	White
Everdur	Yellow
1/4 Hard Leaded Brass	Blue